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EDINBURGH
MEDICAL JOURNAL.

EDITED BY

G. A. GIBSON, M.D., F.R.C.P.Ed.

NEW SERIES,

VOL. III.

45

EDINBURGH & LONDON:
YOUNG J. PENTLAND.
1898.

EDINBURGH: PRINTED FOR YOUNG J. PENTLAND, 11 TEVIOT PLACE,
AND 38 WEST SMITHFIELD, LONDON, E.C., BY MORRISON AND GIBB LIMITED.

CATALOGUED
JUN 23 1898
E. H. B.

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EDINBURGH MEDICAL JOURNAL.

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ORIGINAL COMMUNICATIONS.

ECZEMA PALMARE AND PLANTARE.

By W. Allan Jamieson, M.D., F.R.C.P.Ed., *Physician for Diseases of the Skin, Edinburgh Royal Infirmary.*

(*Read before the Edinburgh Medico-Chirurgical Society.*)

There is a remarkably obstinate form of chronic eczema, which attacks the palms, and, though more rarely, the soles sometimes also. This is occasionally only part of a more widespread development of the disease, but is perhaps oftener seen alone. Prior to its appearance, there may be elicited a history of dryness of the palm, with a degree of associated itchiness, but whether this has been remarked or not, the complaint commonly takes its origin in the centre of one palm, though it is generally not long till both are implicated, possibly, however, to an unequal extent. When such cases come for advice, there are hard scaly patches of infiltrated skin, involving more or less of the surface. There is ragged and uneven scaling, yet not very pronounced, while in the natural lines of flexion, or independent of these, are deep and painful cracks. The hands feel hot, and burn and itch at times, though this latter feature is scarcely so aggressive as in eczema of other regions. From functional reasons, the integument of the palm is less movable than elsewhere, and the infiltration renders it absolutely fixed. Hence, should the case be a severe one, the hand is habitually held in a half-closed position, any attempt at extension giving rise to much suffering by tearing open the existing fissures or producing new ones. In this way the member is all but useless for work. The morbid condition even in its extremest grade is pretty nearly confined to the palm, advancing sometimes along the fingers towards their tips, the pulp remaining, as a rule, immune.

The secretion of sweat is almost wholly suspended, provided the hands are uncovered, but temporary relief can be obtained by artificially correcting this, by soaking in water, or freely rubbing in oily lubricants. No curative effect is thereby procured, as when the hand is allowed to dry, or the oily application is intermitted, there is rather an aggravation. As Bulkley says: "When kept constantly wet, such hands will be quite flexible, and patients even with a greatly aggravated eruption will sometimes be able to do washing, although each time the hands are dried thereafter, they are worse, and the suffering from them may be intense."[1]

The feet may be similarly affected, but on the soles it seldom reaches such proportions. This is because they are more protected from changes of temperature, while from wearing stockings and shoes a degree of moisture is favoured, so that fissures are not so common nor generally so painful. A symptom is observed there which is not so evident on the palms, namely, the existence of a band of congestion beyond the scaly area, fading imperceptibly into the natural tint of sound skin. This is merely the outcrop of the subjacent hyperæmia, veiled from observation by the thickness of the horny layer itself and the opacity of the abnormal scaly accretions.

Though met with in both sexes, this variety of eczema is most commonly encountered in women, and in them about the menopause. "This discloses its influence," as Jacquet puts it, "in the form of congestive attacks, supplementary to the menstrual flows which have disappeared."[2] At the same time, we meet with instances at a period of life much antecedent to that. There are other factors at work in some cases. One of these is a gouty element, often an obscure one, but possibly connected with the cessation of the periodical loss, the tendency to obesity, and the discontinuance of exercise, or at least the disinclination towards it, observed at that epoch of female life. Another, valid in both sexes, is worry or anxiety, the deleterious effect of which on nutrition there is no need to further insist on. Causes of local irritation may exert a determining influence, but these are frequently impossible to trace in women, occasionally more evident in men.

Turning to the pathology of the affection, we find that the dense resistant film of keratin, which forms the protective surface of the palms, may undergo various morbid changes. One of these is simply hypertrophy. The layer takes on an increase in thickness, either in limited areas, or pretty extensively over the palm or sole. This is known as hyperkeratosis, and finds its exemplification in the congenital and often hereditary form of ichthyosis or tylosis, in callosities (those efforts to protect from the injurious friction of manual labour), or on the foot as corns, the reaction against an ill-fitting shoe. Here there is no more than an exaggeration of a natural process. But there are also anomalies in cornification, and to one of these Auspitz first attached the name parakeratosis, a term which has been adopted by Unna, who has defined, amplified, and analysed it, so that it has now come to occupy a definite place in cutaneous terminology. According to him, it is, reduced to its simplest terms, an œdema of the transitional epithelium, a true parenchymatous œdema, a dropsical condition of the epithelial cells themselves. As a consequence, the prickle layer of the affected part becomes broader than normal, and the state of the granular layer in particular indicates the soakage of the epithelium, for the separation of keratohyalin is arrested, or the granules composing it grow extremely fine, while the layer itself is thicker than is customary. The horny layer, too, is moist, thus less brittle, less coherent than it should be, and separates in masses of flakes, not insensibly as scales. There is delay in the process of cornification, which indeed is never fully accomplished, the epithelial cells drying up in place of undergoing a complex series of changes. "Parakeratosis consists, then, only in an abnormally simple cornification, that is in the absence of the many intermediate stages (separation of keratohyalin, breaking up of the nucleus, drying up of the internal protoplasm) which accompany normal cornification. The cell wall becomes cornified or hardened as usual, but the cell contents remain moister and better preserved. Proper cornification is hindered by the abnormal saturation, the parenchymatous œdema, of the epithelial cells."[1] To this there is added epithelial growth —acanthosis and exudation—catarrhal inflammation, in short.

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[1] "Eczema and its Management," 1881, p. 211.

[2] "Saint Louis Atlas of Skin Diseases and Syphilitic Affections," 1897, pt. 9.

Now this peculiar anomaly of cornification, along with the other phenomena just mentioned, is seen in a very typical form on the palms and soles, and is in one of its manifestations regarded as eczema. Much the same condition occurs, however, under other circumstances, in accordance with a law well formulated by Jacquet. "All parts of the skin, which are anatomically and physiologically specialised, have a tendency to impress common characteristics upon lesions affecting them, and always in a similar determinate manner. This is particularly true of the palms and soles when the horny type is assumed. Thus lesions of widely different nature (psoriasis, eczema, lichen, syphilides, etc.) tend to become uniform one with another, and also with certain affections special to these parts—such as the essential keratodermias, the nature of which is very imperfectly known."

The diagnosis of such cases is not always easy. Though frequently—erroneously—designated psoriasis palmaris, the difficulty does not lie between this dry scaly form of eczema and true psoriasis, for though psoriasis does sometimes attack the palms, and there gives rise to an analogous condition, yet this is so rare as an affection, independent of psoriasis elsewhere, as to be practically out of court. The same may be said in even stronger terms of lichen planus. There does not appear to be a single recorded instance of lichen planus in which the eruption was limited to the palms. The influence of syphilis, however, must be rigidly excluded. When the palms are attacked in the secondary and symmetrical period, there can scarcely be much perplexity, since there are sure to be some local or constitutional evidences discoverable. In the tertiary period, again, syphilis rarely invades both palms; it starts from separate foci, is apt to assume a crescentic arrangement, and to heal in the centre while it progresses circumferentially. In the intermediate epoch, however, between the second and the fifth year from infection, we may meet with a keratosis of the palms manifesting itself symmetrically. Sometimes, too, there is a compound of eczema and syphilis, extremely puzzling, and refractory in the last degree. This extends as a diffuse redness over the entire palm, often advancing on to the flexor aspect of the wrist, and terminating there with a defined and crescentic margin. There is comparatively no itching, and if there are fissures, these are superficial and few. The colour also is different from that of eczema; it is more a dull coppery tint, due to the heightened blood hue shining, as Unna has shown, through the syphilitic plasmoma with increased translucency, from the absence of collagenous substance. Nor can we obtain much satisfaction from the therapeutic test, as this is apt to be unsatisfactory, especially in the instances where a blending of the two diseases occurs.

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[1] "The Histopathology of the Diseases of the Skin," English edition, 1896, p. 199.

Another form of keratosis of the palms which must be excluded is that consequent on the administration of arsenic. The idea that arsenic is not only "good for the skin," but has a special property of rendering the complexion clear and beautiful, has taken firm hold of the popular mind, and is fostered by delusive advertisements. Valuable as arsenic is as a medicine in certain ailments, if judiciously used, it occasions, if taken even in small doses for a length of time, not merely a dinginess, but a positive pigmentation of the skin generally. On the palms and soles it exerts its stimulant action on the sweat glands, giving rise first to hyperhidrosis of these regions, then to the formation of warty corns round the sudoriparous orifices, and finally, by their coalescence, to a diffuse hyperkeratosis, the surface being covered by a dense yellow investment, associated with burning sensations. Attention to this property of arsenic was primarily drawn by Jonathan Hutchinson, and many examples are now on record. Sometimes the dose has been trifling, or the drug has not been continued long; in such, a special idiosyncrasy must be admitted. In other instances the keratosis apparently began after the exhibition of the medicament had ceased, yet once started the process tended to encroach on new ground. The hyperhidrosis, the origin at the sweat pores, the warty corns, and the burning sensations, should arouse suspicion.

Occasionally the *Primula obconica* may cause a patchy parakeratosis of the hands, lasting for some time, arising from squeezing the leaves. The lesion as I have seen it is superficial, and is not strictly limited to the palms.

Besides these, there are two rare conditions—the symmetrical keratodermia of the extremities described by Besnier,[1] where there are warty thickenings of portions of the palmar and plantar surfaces, surrounded by an erythematous zone, slowly progressive but not painful, and with no subjective symptoms. Also the cases discussed by Brooke,[2] as erythema keratodes, where a thick covering of yellow horny epidermis appeared on the palms and soles, bounded by an erythematous areola, and accompanied by heat and other inflammatory symptoms. In his cases there was pain and tenderness but no cracks. Our acquaintance with these latter is too restricted to permit of any exact generalisation.

The treatment of this form of palmar eczema has hitherto been unsatisfactory and disappointing. No doubt one could give great relief, and sometimes cure, by the use of agents, such as salicylic plasters or salicylic collodion, which occasioned separation of the thickened masses, and the subsequent application of salves containing lead, such as the ung. diachyli or ung. vaselini plumbicum, to promote a more healthy growth. But the procedure was a slow one, and the disease strongly tended to relapse. The peculiar softening effect of emol keleet, when applied as a thick watery magma, covered with an impervious material to prevent drying, led me at first to hope that by its means a cure might be obtained. But though the immediate results were admirable, the condition soon recurred on discontinuance of the emol keleet. We were still seeking for some substance which would so modify the epithelium, when the accretions had been got rid of, and the surface had become smooth, as to restore normal cornification, when Unna visited Edinburgh about eighteen months since, and introduced to notice his oxidised pyrogallol, as a remedy for lupus erythematosus and psoriasis. Pyrogallol, or pyrogallic acid, had proved itself most useful as an elective destructive agent in lupus vulgaris, and valuable in the dispersion of limited patches of psoriasis, particularly of the scalp, but it was too toxic to employ over large areas, and even on small was liable to evoke a troublesome dermatitis, which in the case of lupus erythematosus led to the appearance of fresh foci of disease. It belongs to those substances which possess great affinity for oxygen, and is therefore called a reducing or deoxidising body. Unna attributed their action to this property, and on various occasions instituted researches into the properties of several members of the group.[1] It occurred to him, however, to further investigate how much this action really depended on the reducing function itself, and how much could be attributed to the operation of the agent when its affinity for oxygen had been satisfied.[2] He had some pyrogallol thoroughly oxidised by exposure to air and ammonia vapour. The brownish-black substance so produced, he found to have no toxic properties, and to occasion no such dermatitis as the unoxidised did, while it was equally effective in causing the disappearance of the patches of psoriasis. When using it in psoriasis, I was struck by the smoothness and polish of the skin left after the fading of the patches. It occurred to me that perhaps in this oxidised pyrogallol would be found the remedy for eczema palmare. A trial was at once made of it in all the cases available, and with gratifying success.

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[1] "International Atlas," pt. 2.

[2] *Brit. Journ. Dermat.*, London, 1891, pp. 23 and 335.

The method of procedure adopted has been the following. The hands (and feet) are enveloped in poultices made of starch jelly, with which some boric acid has been incorporated, *not merely sprinkled on*, applied cold between two folds of cotton cloth. Each time the poultices are changed—once in four or six hours—the palms are briskly rubbed with a rough, though soft dry cloth, and thus the soddened, unhealthy epidermis made gradually to peel off. Not too much is attempted at a time, but in course of four or five days to a week the palms will have become smooth, soft, pliable, and of a pinkish hue; cool, extensible, and free from itchiness. The poultices are now laid aside, and an ointment thus compounded rubbed in well but sparingly each day.

℞ Acidi pyrogallici oxydati . . .	grs. 5–30.
Lanolini	semi-unciam.
Ol. amygdalæ,	
Aq. destillatæ	ana drachmas duas.
	M.

To this has in some cases been added 10 grs. of salicylic acid. The ointment blackens the parts to which it is applied, but chiefly such as had been the seat of the parakeratosis. This returns for a time to a slight extent, but can be kept under by washing with a resorcin and salicylic soap, made with a superfatted basis, more or less friction being employed according to circumstances. The effect of the oxidised pyrogallic acid ointment in restoring normal keratinisation is quite remarkable, and, so far as my experience yet goes, it is permanent. Further time must elapse ere one can speak quite definitely as to this, but nothing hitherto tried has at all approached it in rapidity and efficiency.

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[1] "Ichthyol und Resorcin als repræsentanten der Gruppe reduzirende Heilmittel," 1886. "Chrysarobin u. Pyrogallussaure in der Praxis," *Monatsh. f. prakt. Dermat.*, Hamburg, No. 3, Bd. ii.

[2] "Neue Thatsachen ueber reduzirende Heilmittel," *Deutsche Med.-Ztg.*, Berlin, 1886, No. 84.

The subjoined cases have been selected from a series treated in this way, as illustrations of the disease and the results of treatment.

The first case is an interesting one, since the patient was long under treatment by other remedies, which, though obtaining a considerable degree of improvement, all failed to cure the disease.

Case 1.—Miss G., a lady about middle age, who has suffered from eczema of the hands for many years, and had been seen by me at intervals during more than six. The disease affected both palms, worst in the centres, but advanced along the fingers, encroaching on their sides; she was otherwise robust, though she occasionally was liable to attacks of indigestion, while the bowels tended to be loose, going on to rather sharp diarrhœa. She engaged voluntarily in mission work of a rather exacting kind, in winter abroad, and was usually worse then. Improvement was effected by the application of salicylic acid in plaster form, by washing with Duncan & Flockhart's resorcin and salicylic acid superfatted soap, by the application of resorcin in lanoline thinned down with almond oil, or later with whale oil. On 24th November 1896, it is noted that the hands exhibit a pretty firm epidermis, though darkened in places by the resorcin, and still a little dry. She was then given the ointment containing the oxidised pyrogallic acid. This was continued till the last time on which she was seen, on the 20th January 1897, when the condition was better than it has ever been. The palms were then quite smooth, with only here and there a trace of brownish scaling. They felt soft and even perspiring.

The duration of the three following cases, before treatment by the method indicated, was just about a year; the rapidity with which all improved as soon as it was commenced was remarkable.

Case 2.—Mrs. R., æt. 48, Berwick-on-Tweed. She came to the Royal Infirmary on 30th June 1897, and was seen by Dr. Norman Walker, who prescribed the application of a solution of tar in quillaia. This was soon left off, and she resorted to a boric acid ointment, and afterwards to a balsamic cream, on her own responsibility. When first seen by me on the 27th September 1897, there was great thickening of the horny epidermis of both palms. The hard masses were heaped up in dark blackish and yellowish layers all over the surface of the palms, extending over the flexor aspect of the fingers almost to the tips. The back of the hands was healthy, but there was a little dry infiltrated eczema on the flexor surface of the forearms. Her health was in all respects good. She was ordered to apply the boric-starch poultices till the hands were soft and smooth, rubbing off the layers of accumulated epidermis as they became softened, then to employ the oxidised pyrogallic ointment, which in this case contained a little salicylic acid. On the 21st October she again presented herself. She had continued the poultices for four days only, when, the hands being soft and free from scales, she commenced the application of the salve. The hands were now soft, smooth, cool, and merely a little rough at the roots of the fingers, and still slightly blackened by the acid, but freely extensible.

Case 3.—Mrs. B., æt. 48, Dolphington, came to Royal Infirmary on 21st September 1897. The disease had lasted a year; it began on the ulnar side of the left palm, and gradually spread till all the surface was involved, though worst in the centre. The right soon also was attacked. There was great thickening of the epidermis, and she could not extend or flex the hands with any ease or comfort. The nails and tips of the fingers remained free. The same treatment was prescribed. The poultices were in this instance continued for a week, then the ointment resorted to. On the 16th October the palmar surface of the fingers was now completely well, soft, smooth, of normal thickness, and but little stained with the pyrogallic acid. There were here and there some yellowish spots of hyperkeratosis on the inner edge of the palms, at the root of the ring finger, and at the margin of the ball of the thumbs. The skin felt cool, there were no fissures, and the hands could be freely flexed and extended without discomfort. The appearance of the palms was very much that of a person accustomed to do a little manual labour.

Case 4.—R. C. M., æt. 40, brassfinisher, Edinburgh, was under my care some years ago with an attack of general eczema, from which he recovered. At present (16th October 1897) only the palms are affected. The centre is of a pale pink tint, and is dry, but there are patches of roughened thickened epidermis, firmly attached, scattered over the palmar surface, with fissures in places. The fingers are also involved nearly to their tips. The nails are healthy. The same treatment was prescribed. He poulticed the hands for ten days, then commenced to use the ointment. When seen on the 30th October, the hands were slightly blackened; the epidermis was, however, already fairly smooth, though the ointment had only been employed four days. There were still here and there some persisting thickened areas, especially on the right near the wrist, where there was a tendency to crack in a longitudinal direction. The surface was cool, soft, slightly pinkish, but the hands could be freely extended.

In the fifth case both the hands and feet were attacked, and in the instance of the former the disease was not limited to the palms, though, after treatment had been begun, it soon became restricted to that part. When last seen the cure was more complete than in the three preceding ones.

Case 5.—P. T., æt. 54, Edinburgh, blacksmith. He had naturally rather hard hands, and did not perspire much on palms or soles. The disease began in June 1897 on palms, as dry, peeling, itchy patches, but it did not continue limited to that part, but, when seen on the 4th September, the whole skin of the hands was affected, great thickening of the horny epidermis on a reddened substratum, obscured to a considerable extent by the parakeratosis. There was a good deal of infiltration. There were fissures occupying the natural folds, and also running transversely to these. The skin of the tips of the fingers was glossy and tense. The hands were very itchy when exposed to the least friction. The soles were almost exclusively affected. The masses of epidermis were dry, flaky-yellow, on a pinkish ground-work formed by the infiltrated and congested corium. The redness, but not the parakeratosis, extended to the ankles and round the sides of the feet. Though cool, the feet were likewise itchy. He had been previously treated with starch poultices, followed by salicylic plasters, and finally tar; and in consequence the feeling of heat, which had been prominent at first, had ceased, so that both palms and soles now felt cool, but further advance in the way of improvement had become arrested. His manner of life was in all respects regular, and his diet on the whole suitable, though there had been a deficiency of green vegetables. The urine was normal. He was directed to poultice in the same way as the other cases, with boric starch jelly, and, when the parts had become smooth, to apply 5 per cent. of oxidised pyrogallic acid in lanoline cold cream. On the 21st September all the swelling of the hands was gone, the palms were smooth, somewhat stained by the acid, but showing no fissures. The feet had in like manner benefited, but were more blackened. The ointment was applied in lessening quantity, and on the 9th November the hands were practically well, the condition of the epidermis restored to natural, and the soles bore the pressure of walking perfectly. As his work is arduous, he has postponed resuming it till next month.

The results of treatment in the last case to be related are not yet so brilliant as in those previously recorded, yet there has been marked improvement. There was no discoverable fault in diet or mode of life, while the general health was apparently as good as could be. The disease in this instance commenced on the soles, not spreading to the hands till a couple of months later, and after a month of treatment the improvement was most evident on the soles, the parts longest affected. The case is specially cited with the view of anticipating any idea that a panacea for eczema of the palms and soles is being vaunted. No such assertion is advanced, yet it is quite possible that a further employment of the remedy, the excipient being modified a little, may in this instance also prove in the end successful.

Case 6.—M. G., æt. 39, builder; a healthy, strong man, who came with his ordinary medical attendant to see me from a country town, on the 27th October 1897. The disease began seven months before in the centre of the sole of both feet. At first there was a degree of moisture. A couple of months later some similar spots appeared on the legs, then on the arms, and finally in the middle of each palm. When examined, the soles were seen to be reddened in the central portion, while on the ball of the heel and over the distal ends of the metatarsal bones the colour is yellow. The redness, which was of a deep purplish tint, extended along the sides of the feet to the breadth of an inch, then faded. There was some scaling on the sole, and, on passing the hand over it, it felt in parts as if there were here and there warty corns, which tended to run together. The soles itch at times, particularly when the feet become hot after walking, or in bed. Scattered over the legs and arms were rough, slightly scabby, yellowish-brown patches, apparently made up of aggregations of conical papules. When these formed they for a time oozed slightly. In the centre of each palm there was a patch of hard, dry, peeling eczema, the size of a florin. His feet never were wont to sweat much, nor do they now. When the complaint commenced he wore heavy boots and thick grey knitted socks. The same treatment by boric starch poultices and oxidised pyrogallic ointment, combined with washing with resorcin salicylic soap after the poultices had been discontinued, was prescribed. He was again seen on the 23rd November, and reported that he had continued the use of the poultices for ten days, when the palms and soles were quite smooth, soft, and pliant. He then commenced the pyrogallic ointment, washing daily with the soap. All the patches on the legs and arms had completely smoothed down, and were nothing more than faint brownish stains. Some others had come out on the thighs and flanks, but had likewise flattened. The red margin to the sides of the soles had disappeared, but the central parts were still rougher than normal, marked with fine lines, but little, if at all, infiltrated. The horny layer of the epidermis on the surface still had a tendency to split and peel. The sclerosed eczema of the centre of the palm had improved less; there were no cracks, but the part was still dry, hard, and with a liability to split. He was directed to wash at night with the resorcin salicylic soap, and subsequently to rub thoroughly well in a salve made up of 15 grs. of oxidised pyrogallic acid in a mixture of lanoline, whale oil, and water. In the morning, before applying it, to rub the parts with a loofah dipped in water. As the soles still felt hot on walking, to wear inside the shoes an inner sole of loofah, the "Vitalité sole," which carries down the perspiration.

Since the onset of eczema palmare is generally insidious, and that of eczema plantare frequently unnoticed at first, measures of prevention are difficult. The risk of recurrence after cure is best obviated by maintaining the healthy state of the skin of those regions. In some cases oatmeal should be substituted for soap, for detergent purposes. If the latter is employed, only the best varieties of the superfatted toilet soaps are admissible in the case of the hands. The epidermis of the soles is to be kept in order by daily friction with a loofah and cold water.

INJURIES OF THE URETER.

By Henry Morris, M.A., F.R.C.S., *Surgeon to the Middlesex Hospital, London.*

Injuries to the ureter are exceptionally rare, if we exclude those which occasionally happen in the course of certain surgical operations on the abdominal or pelvic viscera. Its small size, its deep position, the fact that in one-half of its extent it is protected by the bony wall of the pelvis, its loose connections whereby it is able to move freely upon the structures behind it, together with its own elasticity, serve to explain this exemption from injury.

In 1885, when writing on "Rupture of the Ureter," I stated[1] there was no occasion to consider it apart from rupture of the kidney, because in the very few cases on record the rupture of the ureter was quite close to the renal pelvis, and that it was neither practicable nor requisite from the point of view of treatment to distinguish between subcutaneous rupture of the renal pelvis and subcutaneous rupture of the ureter.

With reference to "Penetrating Wounds of the Ureter," I therein pointed out that, with the exception of the gunshot wound of the ureter which happened to the Archbishop of Paris in 1848,[2] and the doubtful case recorded by Hennen in 1818,[3] there did not exist any published report of a penetrating wound of the ureter alone, unless we accept Holmes' very doubtful case as such.[4]

No case of penetrating wound is reported to have occurred in the American War of the Rebellion; and when we recall the care and thoroughness with which the medical and surgical history of that war was prepared, this fact alone shows the extreme rarity of such injury.

The conclusion arrived at was that the diagnosis, symptoms, sequelæ, and treatment of injured ureter in no way differed from those of ruptured or wounded kidney.

These remarks were based upon a careful perusal of the reports of thirteen cases described as subcutaneous injuries, and upon the three cases above mentioned of penetrating wounds. The cases were all that I was at that time able to discover, after a fairly laborious search through the literature of wounds and other injuries of the abdominal viscera.

Two of the cases of subcutaneous injuries had been under my own personal observation; as dresser to Mr. Hilton, I was responsible for the notes of his case, which was one of rupture of the kidney, not, as Poland described it, and others have quoted it as being, one of rupture of the ureter; and, as house surgeon at Guy's Hospital at the time, I daily watched Mr. Poland's case, which was really one of ruptured ureter.

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[1] "Surgical Diseases of the Kidney."

[2] *Gaz. d. hôp.*, Paris, 1848.

[3] "Military Surgery," 3rd edition, p. 430, Case 72.

[4] *Med.-Chir. Trans.*, London, vols. lx. and lxv.

Although reports of renal cases of a surgical nature have during the last ten years multiplied a thousandfold, and although experimental researches and tried or suggested operations upon the ureter have led to the surgical affections of the ureter being considered as a subject apart from the surgical affections of the kidney, there is very little as yet which can strictly be called ureteral surgery; and very few cases have been published which are really cases of unmixed ureteral disease or injury.

Since 1885, only seven cases, so far as I am aware, have been published, purporting to be subcutaneous injuries of the ureter (namely, by Godlee, 1887; Chaput, 1889; Le Dentu, 1889; Coull Mackenzie, 1891; Allingham, 1891; Fenger, 1894; Page, 1894). These are not, however, all cases of injury to the ureter proper, and they do not supply any grounds for altering the conclusions based upon earlier cases.

In view, however, of the growing importance attached to the surgery of the ureter, it is well to describe the injuries of the ureter, and the operations performed and suggested for their relief, apart from those relating to the kidney.

The injuries involving the ureter depend very much as to their symptoms and gravity upon whether they are subcutaneous or open, extra- or intraperitoneal. They may be conveniently considered under three classes—

1. Subparietal injuries; or those in which no open wound communicates with the injured ureter.

2. Penetrating wounds; or those in which an open wound communicates with the injured ureter.

3. Surgical wounds, accidentally or intentionally inflicted, including those which are caused by the use of obstetric instruments, or following gangrene due to difficult or prolonged labour.

Those which result from gangrene and from surgical accidents come necessarily for consideration under ureteral fistula; whilst those made intentionally by the surgeon come under "Operations upon the Ureter."

In all three classes the peritoneum may or may not be involved. In Class 1, as a rule, it is not; in Class 2 it is most likely to be; whilst in the accidental wounds of Class 3, excepting those produced by obstetric instruments, it almost always is.

In this article I shall confine my remarks to Class 1, that is, to subparietal injuries of the ureter.

Twenty-three cases are now scattered through surgical literature, which have been repeatedly mentioned by writers as subcutaneous injuries of the ureter; but a close examination of the details given of them shows that twelve at least are injuries of the parenchyma or pelvis of the kidney not of the ureter proper, and there is considerable room for doubt as to the exact nature of the injury in several of the others. The explanation of the fact that cases of ruptured renal pelvis are so often described as ruptured ureter is no doubt in part due to the want of uniformity in the use of terms. The ureter in anatomical works is described as commencing at the renal pelvis; but the term renal pelvis is often used as if it were synonymous with hilum of the kidney, instead of embracing that dilated part of the renal duct which extends from the union of the calyces to the upper end of the ureter proper.

The following is a list of the twenty-three cases to be found in surgical literature, described as "rupture of the ureter." Thirteen of them were more or less fully quoted in my book on the kidney in 1885. Seven others have been published since then. The remaining three had been overlooked, and were those by Joel, Cabot, and Bardenheuer. The whole twenty-three cases are now arranged in four different groups.

(A) Verified cases of rupture of the ureter—(1) Poland (with extraperitoneal extravasation and tumour), (2) Coull Mackenzie (with intraperitoneal extravasation, but no tumour).

(B) Probable rupture of ureter with extravasation—(1) Stanley (boy), (2) Godlee, (3) Chaput, (4) Page.

(C) Contracted ureter, with hydronephrosis, etc., possibly due to ureteral injury—(1) Haviland, (2) Pye-Smith, (3) Soller, (4) Cabot, (5) Fenger.

(D) Not injuries of the ureter proper, but rupture of renal pelvis or renal substance opening calyces, and giving rise to extravasation—(1) Stanley (female), (2) Hilton, (3) Hicks, (4) Barker, (5) Bardenheuer, (6) Dumenil, (7) Joel, (8) Allingham, (9) Harrison (two), (10) Croft, (11) Bennet May.

Besides the above, Dr. W. J. Collins[1] has published two cases of traumatic hydronephrosis, in which the injury may have been either to the ureter or to the renal pelvis. Dr. Collins thought that the most plausible explanation of one of these cases was occlusion of the ureter, from contraction following bruising at the time the child, æt. 5, was run over; or else compression by blood, or by callus thrown out around a fracture of the pelvis. In neither case was there any direct evidence as to the cause of the hydronephrosis.

Of the twenty-three cases, we find only eleven with any pretensions to be considered injuries of the ureter proper, and of these only two were actually proved to be ruptures of the ureter. One of the two (Coull Mackenzie's) was an undoubted case of intraperitoneal laceration, and was verified as such by post-mortem examination.

In five cases (Group C) a tumour was formed by alteration in the kidney itself. In four of these, contraction or obliteration of the ureter followed the injury, and after a long time a renal tumour formed; in three of them the condition was ascertained by post-mortem examination to be, in one, pyonephrosis with atrophy and impermeability of the ureter (Haviland's); in another, pyonephrosis (which had at one time communicated with the colon), with the ureter contracted 1½ in. from its commencement, so as scarcely to admit the smallest probe (Pye-Smith's); and in the third the kidney was converted into a large polycystic tumour, and the ureter in the middle of its course was almost obliterated (Soller). In the fourth case the ureter was strictured, and an intermittent hydronephrosis developed ten years after the injury. The stricture had existed for twenty-four years when Fenger performed ureterotomy from the loin. He divided the stricture, and closed the wound in the ureter by longitudinal sutures, after the Heinecke-Mikulicz method for the treatment of pyloric stricture. The patient recovered, and had no return of the hydronephrosis (Fenger). In the fifth case (Cabot) the nature of the obstruction and its precise situation was not ascertained. It is described by Cabot as one of "nephrotomy for hydronephrosis," and resulted in recovery. The swelling developed "several weeks" after a fall, and it seems to me highly probable that the obstruction was only partial and temporary, and was caused by blood clot, either in the renal pelvis or in the ureter, which subsequently became absorbed or passed on into the bladder.

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[1] *Brit. Med. Journ.*, London, April 30, 1892.

In Haviland's case the injury was received four years before the tumour developed, in Pye-Smith's two years, in Soller's nine, and in Fenger's ten years before. It is very doubtful whether the condition of the ureter in Haviland's and Soller's cases was not due to causes other than injury.

In five cases, namely, those included in Group B and Poland's case, a tumour was formed by a collection of fluid behind the peritoneum.

In none of these instances was the precise seat of the extravasation ascertained. Stanley's case was that of a boy in many respects precisely like Croft's and Bennet May's and others, where the injury was supposed or ascertained to have implicated the renal pelvis and not the ureter.

There is also much room for doubt as to whether the ureter proper was injured in Godlee's case. It is more than probable that the injury was to the renal pelvis, but that it could not be discovered at the time of the nephrotomy, nor, owing to the difficulty in separating the kidney from the surrounding tissues, at the subsequent nephrectomy. We cannot, however, positively exclude either of these cases from the list of injuries to the ureter. The two other cases in this group (Chaput and Page) are in great probability veritable injuries of the ureter proper.

Chaput's case is exceptional, in that the cæcum was ruptured on its posterior aspect, and the extravasated urine not only accumulated in the retroperitoneal tissue, but entered the cæcum through the rupture in its wall, and distended this and the neighbouring colon so as to create a very misleading abdominal tumour.

In three of these cases (Godlee, Chaput, and Page), an incision, followed by drainage of the retroperitoneal space, was practised, and in Godlee's case evacuation had been effected before the lumbar incision was made. In each of these three cases nephrectomy was subsequently and successfully resorted to, because of pyrexial attacks due to suppuration of the kidney, and of the persistence of a fistula.

In Page's case the incision was made in the linea semilunaris, and drainage was effected through this. In Chaput's case, as well as in Godlee's, the incision and drainage were through the loin.

The fifth case, in which a tumour formed behind the peritoneum (Poland's), is allied to the four cases just mentioned, though it differs from them in some most important particulars. As the accident resulted in death on the sixth day, the exact nature of the injury was ascertained by post-mortem examination.

Poland describes the ureter as torn quite across, just below the renal pelvis; and its broken end, together with the kidney, was surrounded by the half-sloughy, putrescent, and jelly-like tissues behind the peritoneum. The kidney itself was injured, its capsule being separated from it by extravasated blood; the renal capsule prevented this blood clot from mixing with the urine extravasated through the torn ureter. The right lumbar region was raised in a great swelling, this being moderately dark in colour from some effusion of blood.

It is unnecessary to analyse the twelve cases in Group D, which have been often quoted as subcutaneous injuries of the ureter, but which in reality are not so. It will suffice to give a list of these, with the dates and references to them. This is done at the end of this article.

We will now summarise the result of a careful analysis of the eleven cases above mentioned, with the view of arriving at the causes, pathology, symptoms, and treatment of ureteral subcutaneous injuries.

CAUSES.—Of the eleven cases above enumerated, forcible compression between two hard bodies, at the level of the umbilicus and loin, was the form of violence inflicted in three; kicks from horses in two (Chaput and Pye-Smith); the passage of the wheel of a carriage over the trunk in two (Godlee and Page); falling on to the back from a height in one (Haviland's); falling down stairs in one (Cabot); the bursting of a cannon shell in one (Soller); and a violent jerk in jumping from a horse in one (Fenger's case). It is noteworthy that in both the cases in which the peritoneum was ruptured (Poland's and Coull Mackenzie's) the form of violence was forcible compression of the trunk—between the platform and a railway carriage in one, and between two heavy trucks in the other.

Tuffier has suggested that the ureter gives way by being crushed against the tip of the transverse process of the first lumbar vertebra. This may be the method by which the renal pelvis more often is torn, opposite the hilum of the kidney; but the ureter only commences a little above the level of the tip of the transverse process of the third lumbar vertebra, too low down, therefore, to be crushed against the first transverse process, though it may be so compressed against the tips of the third, fourth, or fifth processes. In Poland's fatal case, in which the ureter at its junction with the renal pelvis was torn right across, the transverse processes of the three upper lumbar vertebræ on both sides were broken off, and the twelfth rib on both sides was fractured.

Le Dentu thinks a veritable tear of the ureter may be caused by the sudden and violent downward displacement of the kidney, the weight of which drags forcibly upon the ureter at its junction with the renal pelvis, or at some point lower down than this, namely, at the level at which the ureter retains, during the shock, its normal attachments.

As the kidney is under cover of the lower ribs, and the lower half of the ureter is protected by the bones of the pelvis, it would seem that any great violence, applied either from in front or from behind, will tend to stretch the ureter most severely at one or other extremity of its abdominal course, whilst the intervening portion will escape with the rest of the soft structures in the ilio-costal space. The holdfast influence of the kidney above, and the resistance of the brim of the pelvis below, would thus tend to the giving way of the ureter at its junction with the renal pelvis, or just above the place where it passes over the sacro-iliac synchondrosis.

The fact that in five out of eleven cases the injury was brought about by violent compression of the trunk in the antero-posterior axis, and in a sixth case (Fenger) was caused by overstretching, gives support to this theory.

The intimate adhesion of the ureter to the peritoneum, the readiness with which it becomes detached with the peritoneum, when the latter is torn away from its connections, and the fixation of the peritoneum to the spinal column, make it probable that the peritoneum will yield just external to the line of fixation to the spine rather than that the ureter will give way. Possibly this is what really happens, and thus the ureter escapes.

The fact that the peritoneum over the ureter was injured in only one case out of eleven, and that in five cases out of eleven there was a large retroperitoneal accumulation of urine, without the peritoneum giving way, suggests that in the rare instances when the ureter is ruptured there is less than the normal adherence between the ureter and peritoneum.

Perhaps this helps to explain the greater frequency with which subcutaneous rupture of the ureter occurs in young life; thus, of ten cases in which the ages of the patients are given, only two were over 30, only one was between 20 and 30, four were between 4 and 10 years of age, and three were between 10 and 16.

The ages at which the accidents happened were 4, 5, 9, 10, 13, 14, 16, 22, 33, 36.

PATHOLOGY.—The actual nature of the injury inflicted on the ureter can only for the most part be imagined, because in only two cases has it been actually seen. In Poland's patient, who died 135 hours after the accident, the ureter was torn right across, below the pelvis of the kidney. The kidney itself was much damaged. In Mackenzie's case there were two small ruptures in the ureter, each of the size of a pea, communicating with the peritoneal cavity.

In both these cases the peritoneum was torn; but only in one (Coull Mackenzie's) did the rent in the serous membrane allow of the entrance of urine into the cavity, and in that case death ensued from peritonitis within twenty-four hours of the accident. In Poland's case, the rupture of the peritoneum was on the anterior wall of the abdomen, and quite distinct from the ureteral injury; the patient died from exhaustion due to vomiting, but there was no peritonitis.

In Mackenzie's case, in which the whole of the peritoneum was described as being highly inflamed, and the intestines matted together by lymph, it is to be regretted that we have no information as to the character of the urine. We know the peritoneum is tolerant of healthy urine; it was probably the admixture of blood with the urine in the peritoneal cavity that caused the fatal peritonitis.

In five cases (out of the nine in which we have no precise definite knowledge of the exact nature of the injury inflicted) it is necessary to assume that the ureter was more or less completely torn across, or else lacerated in a longitudinal direction, in order to explain the extravasation of urine into the retroperitoneal cellular tissue. In those instances where the ureter was found constricted or obliterated, some long time after an injury, one of several things may have happened. The ureter may, in the first instance, have been simply contused, or its wall may have been only partly torn through, and subsequently have undergone cicatricial contraction, or occlusion; or the cellular tissues around it may have been the seat of the injury, and the constriction of the ureter may have been the consequence of the subsequent inflammatory changes in those tissues, or of compression by blood clot on its exterior; or, again, the narrowing may have been the result of hæmorrhage from the kidney, and the impaction and subsequent organisation of a blood clot in the ureter,—the changes in which, after a time, may or may not have allowed of the passage of urine.

But however this may be, the inference is obvious, that if the coats of the ureter are completely torn through, and the peritoneum is intact, a tumour will sooner or later be formed by the accumulation of urine in the retroperitoneal tissue; whereas, if the ureter, from direct or indirect injury, becomes imperfectly obliterated, a tumour will in course of time be formed, consisting of one or other of the varieties of obstructed kidney, namely, renal abscess, pyonephrosis, hydronephrosis, or, as in Soller's case, a polycystic kidney.

If the ureter were to be at once completely obstructed by blood clot, and permanently remain so, the result to be expected is atrophy of the kidney. Yet this does not necessarily follow, as shown by the post-mortem examination on a man æt. 36, whose right kidney was ruptured by the kick of a horse. In this case (recorded by Mr.Holmes)[1] the ureter, renal pelvis, and calyces were found plugged with blood clot eighteen months after the kidney had been ruptured; the clot in the interior of the kidney communicated with a mass in the perinephric cellular tissue, and the line of rupture could be faintly traced through the substance of the gland, which was quite healed. Both kidneys were small, granular, and cystic, and had probably been so for a year or two before the accident. There was no marked difference in the size and general appearance of the two kidneys.

In two of the eleven cases under consideration, a communication was formed between the urine cavity and the large bowel; in Pye-Smith's case the colon was, at the post-mortem examination, found adherent to the pyonephrotic cyst, but the communication had become closed. In Chaput's case, a rupture of the posterior wall of the cæcum allowed of a communication between the bowel and a large retroperitoneal collection of urine.

SYMPTOMS.—The manifestations of subcutaneous rupture of the ureter are not characteristic. For a time there may be no sign whatever beyond the pain and tenderness caused by the injury. It is only by the subsequent development of symptoms that we are able to learn that any damage has been done to the urinary system, and not even then are we able to say at once whether it affects the renal parenchyma, the renal pelvis, or the ureter.

There may be no immediate indication in the urine of any kind whatever. Hæmaturia may be entirely absent, the urine being passed naturally and freely, as in Stanley's, Godlee's, and Chaput's cases; or slight hæmaturia, of a more or less transient character, may be observed, as in Page's patient, who, after the second day, passed at intervals small quantities of blood with the urine; or as in Cabot's case, in which there was bloody urine for three or four days; or as in Pye-Smith's patient, who had hæmaturia for several days after the injury.

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[1] *Trans. Path. Soc. London*, 1860, vol. xi. p. 140.

If the ureter alone is ruptured, it is not likely that the hæmaturia will be very considerable or prolonged. But slight hæmaturia, or even the absence of hæmorrhage, is in no way characteristic of ureteral as distinguished from renal injury, because many cases prove that there may be but little or no blood whatever in the urine, even though the renal pelvis or the renal parenchyma be wounded.

If, besides injury to the ureter, one or both kidneys are seriously damaged, there may be incomplete or complete suppression of urine. Thus, in Poland's case, there was thrombosis of all the vessels of the opposite kidney, as well as severe damage to that on the side of the torn ureter—very little urine indeed was passed during the few days the patient lived.

A common immediate symptom is pain and tenderness at the part injured. The pain may be referred to the loin, front of the abdomen, umbilicus, or to the middle of Poupart's ligament. This pain may pass off in a day or two, and the patient may remain quite free, till fresh pain is caused by the development of a tumour. Transient collapse and vomiting may occur.

In some of the cases (Stanley's, Poland's, and Godlee's) there was ecchymosis over the loin, abdomen, and inguinal region, and in Stanley's there was extensive suppuration of the cellular tissue about the loin and sacrum. If the patient survives the injury, a swelling will form on the injured side of the abdomen, or in the corresponding flank, within a period varying from a few days to several years.

The abdominal swelling may be caused either by a collection of urine, or urine and blood, behind the peritoneum, or by one or other of the changes which supervene in the kidney itself. If due to a retroperitoneal collection, the swelling forms much earlier than when due to change in the kidney itself; appearing usually within a few days or weeks in the first event, but only within "many weeks," months, or even years in the latter.

Of the five instances in which the swelling was *behind the peritoneum*, it appeared within a day or two in Poland's case, at the end of the sixth week in Stanley's, and within two or three weeks in the others.

The swelling is usually well defined, palpable from the loin and front of the abdomen, and is round, oblong, or sausage-shaped. It may extend from the thorax into the false pelvis, and may reach the median line of the abdomen.

The length of time which elapses before the appearance of this tumour, depends upon (1) the character of the rupture; (2) the degree of resistance to the escape of urine offered by the tissue into which it passes; and (3) to the interference—caused by the shock, or by damage—with the secreting capacity of the kidney.

The rent in the ureter may be very small, or, on the other hand, the tube may be torn right across. If separation is complete, the ends may possibly be curled up, as Tuffier asserts was the case in some of his experiments on dogs. Such a condition would offer an obstacle to the escape of urine; it was not, however, found to have occurred in Poland's case, in which the tear was complete, and the ends separated.

A much more likely obstacle will be blood clotted over the orifice, or around the torn end of the tube. Blood clot may fill the calyces and pelvis of the kidney; or the parenchyma of the kidney may be compressed by blood extravasated beneath the capsule; or the renal vessels may be thrombosed. Under any of these circumstances, urine would fail to escape or even to be secreted.

Again, the cellular tissue may be very dense and not easily opened up, or its meshes may be packed with extravasated blood, and thus much opposition offered to infiltration of urine. The shock of the accident, and the reflex suppression of urine following the injury, would explain only a certain amount of delay.

In injury to the ureter, as in injury to the renal pelvis, it is possible that the escape of urine may only follow the sloughing out of severely bruised tissue, and not take place as an immediate consequence of the original violence.

When the lesion occurs *on the peritoneal aspect* of the ureter, it is to be expected that the escape of urine will be early and profuse, as there is then less resistance to the outflow of urine; and no tumour will be likely to form in the flank.

As soon as the urine, or urine and blood, which have collected in the retroperitoneal space decompose, inflammation, suppuration, or sloughing occurs, and other symptoms then arise, namely, increased pain, redness of the skin in the loin, œdema of the abdominal wall, elevation of temperature to 101° or 102°, or even a degree or two higher, rigors, furred tongue, loss of appetite, and constipation or diarrhœa.

In both cases (Chaput and Pye-Smith) in which a communication between the bowel and the urine cyst was found to have existed, diarrhœa or simulated diarrhœa was a noticeable symptom.

The fluid drawn off from the tumour, before suppuration has commenced, has the characters more or less pronounced of urine, in colour, odour, and composition; but it is generally slightly alkaline in reaction, of a low specific gravity, *e.g.* 1008 to 1010, and contains very little, perhaps only a mere trace of urea. It will probably also contain a small quantity of albumin, a little blood, and most likely a considerable amount of chloride of sodium. When the parts become septic, the fluid withdrawn will also contain more or less pus.

In Chaput's case the fluid withdrawn on the twelfth and fourteenth days after the injury was sanguinolent, and showed fatty globules and altered leucocytes and red blood corpuscles, and was thought to be the fluid of a hæmatoma on its way to suppuration.

In the five cases in which the swelling was *in the kidney itself*, the tumour was noticed at very different lengths of time after the injury. In one case it is stated to have been "several weeks," in others it was two years, four years, and nine years respectively. In Fenger's case, ten years elapsed between injury and hydronephrosis, and thirty-four years between the injury and the ureterotomy by which the intermittent hydronephrosis was remedied.

The nature of the renal tumour was very different in these five cases. One was an abscess-like dilatation of each of the calyces (Haviland's); one a pyonephrosis, the contained fluid being opaque and reddish and loaded with pus and blood cells (Pye-Smith's); in another (Soller's) it was a large polycystic kidney; in Cabot and Fenger's cases the condition was described as hydronephrosis.

Occurring at such long intervals after the accident, and with the intervening period between the injury and the formation of the renal tumour, perhaps absolutely without symptoms of any kind, these cases clinically come to have importance less in relation to injuries of the ureter than to renal enlargements generally.

DIAGNOSIS.—If there is at first little or no hæmaturia and no swelling in the loin, and then after three or four weeks, more or less, a swelling forms behind the peritoneum, rupture of the ureter may be suspected. If, many months or even years after an injury in the region of the ureter, a tumour of the kidney is formed, though there has been an absence of symptoms, or only slight hæmaturia at the time of the injury, there will be ground for suspecting traumatic contraction or occlusion of the ureter.

It is, however, impossible to distinguish injured ureter with extravasation, from injured renal pelvis with extravasation; injured ureter with complete obstruction by clot or recurved ends is equally indistinguishable from injured kidney with clot plugging the renal pelvis or the ureter. Nor is this impossibility of exact diagnosis of any practical importance, because the treatment must be the same.

Some assistance may perhaps be obtained, where an opening in the ureter is believed to exist, by distending the bladder with water. Kammerer found that the water escaped by the defective ureter until the bladder was quite distended, and then, doubtless through closure of the valvular entrance in the bladder, the water ceased to flow. Le Fort and Page applied this test in their cases, but without effect.

M. Tuffier thinks that a constant escape of urine after a wound of the ureter is the leading distinction between these injuries and wounds of the kidney. Wound of the kidney will cicatrise easily and rapidly, and give rise to no extravasation of urine, whilst wounds of the ureter have no tendency to natural cure. If by "wounds of the kidney" Tuffier means also wounds of the renal pelvis, and wounds opening the calyces through the renal parenchyma, facts are against him. Even if this were a leading distinction, it would give no aid to diagnosis in subcutaneous injuries.

PROGNOSIS.—In cases not complicated with other serious injuries, the immediate effect of these accidents is not to endanger life, if the peritoneum is uninjured. If prompt and decided surgical treatment were adopted, the consequences to the kidney itself would be less unfavourable; and subsequent nephrectomy would probably be less frequently required than has been the case hitherto.

When the peritoneum is involved the outlook is most serious: in both the fatal cases the peritoneum was injured, and in one of them the cause of death was peritonitis. In the other case the wound in the peritoneum was not in the neighbourhood of the kidney and ureter, and no evidence of peritonitis was found at the post-mortem examination.

TREATMENT.—The ideal treatment for subcutaneous rupture, whether in a longitudinal or transverse direction, is immediate suture or anastomosis of the ureter, according to the character of the wound. But it is useless to state that this is the treatment at once to adopt, when the indications of the exact injury do not occur until weeks after the rupture has taken place; when there is nothing even then to indicate the site of the rupture, and when the retroperitoneal tissues have become changed by the pressure and inflammation caused by the extravasated fluid.

Puncture of the retroperitoneal cyst has been adopted, but with uncertain result. Stanley's doubtful case was tapped six times, and yet the tumour occurred again, and persisted as long as the boy was under observation. We must remember, however, that a repetition of punctures has been followed by the complete and permanent disappearance of the swelling, in cases of retroperitoneal extravasation due to rupture of the kidney or renal pelvis, and also in cases of traumatic hydronephrosis. Whilst in some of these cases in which the tumour ceased to refill, the ureter may have become patent, it is probable that in most of them the kidney ceased to secrete, and atrophied—a result which cannot be regarded as satisfactory.

Lumbar incision.—A free incision in the ilio-costal space will secure the complete evacuation of the extravasated fluid; and drainage will obviate the reaccumulation of urine subsequently escaping through the ruptured tube. If the ureter is not completely torn across, the experience afforded by the removal of calculi from its upper end would lead one to expect the ultimate cicatrisation of the wound, and the re-establishment of the ureteral channel to the kidney.

Through this incision it will be possible to explore the renal pelvis, and if the state of the kidney indicates that the urine has escaped at some point in the ureter, and not from the kidney, the loin incision may be prolonged in a direction towards Poupart's ligament, passing about a finger's-breadth in front of the anterior superior spine of the ilium. It will no doubt be very difficult to trace the ureter in tissues which have been changed in structure, and when its normal position is disturbed in consequence of the previous extravasation. The search, however, may be somewhat facilitated by remembering that the ureter is carried forward with the detached peritoneum; and that it is intimately attached to that membrane about half an inch, or little more, external to where the peritoneum is tied down to the side of the spinal column. If a rent in the ureter should happen to be found, it should be repaired by suture.

In none of the cases, however, which have hitherto been operated upon has the site of the injury been ascertained. Page says that the thought of closing the wound by suture occurred to him when he laid the cyst open, but the portion of the ureter visible was intact, and as it coursed away from the region of the kidney he did not think it desirable to follow it.

It is to be expected, however, that by a more extensive parietal incision, a freer search for the rupture, and with the aid of the ureteral catheter, the actual wound may be found and directly treated in future cases.

The proposal to apply an aseptic ligature to the torn upper end, with the object of inducing atrophy of the kidney, is to my mind very unsurgical. If the rent can be closed by sutures, so as to restore the continuity of the ureteral channel, this should be done. If the rupture cannot be found, the loin incision followed by drainage will put the damaged parts into the most favourable condition for repair. We have abundant evidence that wounds of the renal substance and renal pelvis, and also of the ureter itself, made by the surgeon for removing calculi, will ultimately heal without the aid of sutures. It should be the surgeon's object, therefore, to put accidental wounds of the ureter which he cannot localise, and therefore cannot suture, under the same conditions favourable for cicatrisation as he places wounds of his own making in operations on the kidney.

If the ureter is completely torn asunder, and its ends can be approximated, they should be united by one of the recognised methods of ureteral anastomosis. If its ends cannot be joined together, then a permanent fistula opening on the loin is the result to be expected. Such a fistula, by saving the integrity of the kidney, would be the means of preserving the patient's life, if his other kidney happened to be destroyed, or he had but one. In a case of my own, in which there was rupture of the renal pelvis, a permanent lumbar fistula followed, and has continued (with one interval of three years' duration) over a period of ten years. On the other hand, if the second kidney is sound, and the fistula badly tolerated by the patient, nephrectomy is the final resource.

Of course, after lumbar incision, it would be requisite to use all customary precautions against sepsis; and if this is done successfully, and the lumbar incision has been made soon after the first development of the swelling, there is but little, if any, reason why the kidney should become the seat of suppurative changes more than after nephrolithotomy, or partial excision of the kidney for tubercle or abscess. It was, however, found that the kidney suppurated in all three of the cases in which the retroperitoneal collection was drained; but in one of them (Godlee's) there was pus in the fluid withdrawn when the cyst was first punctured, and before it was laid open by lumbar incision. In another (Chaput's) there were special conditions favouring sepsis, because there was a communication between the large bowel and the retroperitoneal collection of urine; and in the third case the drainage was imperfect, being made through the linea semilunaris, instead of through the ilio-costal space behind.

Nephrectomy.—Nephrectomy will be required, if pus in the extravasated fluid, continued high temperature, or recurring pyrexial attacks, with pain, loss of appetite, and emaciation, make it clear that the kidney or the retroperitoneal tissue is the seat of extensive suppuration. Nephrectomy may be demanded also in the absence of suppuration, if a permanent fistula has resulted and is a source of intolerable discomfort to the patient.

It has sometimes been stated that primary nephrectomy would be the best treatment in all cases of subcutaneous injury, whether of the kidney, renal pelvis, or ureter, attended with retroperitoneal extravasation of urine; but I am not of this opinion. Undoubtedly the danger of primary nephrectomy for severe injury is not inconsiderable; but the chances of recovery after secondary nephrectomy for septic nephritis are less than after primary nephrectomy for injury. The chance of recovery, with perfect function of the kidney on the injured side, ought, however, when the kidney is not also irreparably injured, to be given to the patient. This will be done by a prompt incision through the loin, as soon as a retroperitoneal swelling is formed, followed by free drainage into antiseptic dressings. Should this not succeed, secondary nephrectomy will very probably save the life of the patient; it did so in all three cases referred to above, and has done so in several similar cases, where the substance of the kidney or the renal pelvis has been torn.

In traumatic hydronephrosis a trial of ureterotomy for division of the stricture should be made, as was so successfully carried out in Fenger's case.

ABSTRACTS OF THE ELEVEN CASES REGARDED AS SUBCUTANEOUS URETERAL INJURIES.

GROUP A.—CASE 1.—Poland's case[1] was that of a woman, æt. 33, in the fifth month of pregnancy, who was squeezed and slowly twisted half a revolution between the platform and the footboard of a railway carriage. On admission there was a small superficial wound of the abdominal wall, about 1½ in. to the left, and a little above the umbilicus, with a subcutaneous laceration of the peritoneum and rectus muscle sheath, through which, on the fourth day, 16 inches of intestine bulged. On the fifth day she aborted, and on the sixth died of *asthenia*.

A few drops of urine were passed on the afternoon of the fourth day, but as this was with the motion, and was thrown away by the nurse, it was not ascertained whether blood was mixed with it or not.

A post-mortem examination revealed fracture of the spinous processes of all the lumbar vertebræ, both twelfth ribs, and both transverse processes of the upper three lumbar vertebræ. The right lumbar region was raised into a great dark swelling by blood effusion. The right ureter was torn quite across, just below the pelvis of the kidney, so that it terminated in a ragged end in the midst of the half-sloughy, putrescent, jelly-like tissues which surrounded the organ. The capsule of the right kidney was separated from the parenchyma by a considerable quantity of blood clot, extravasated over the anterior aspect of the organ, and prevented the mixing of this blood with the urine extravasated from the ruptured ureter. The blood under the capsule was derived from a rent on the posterior and lower part of the organ, which penetrated to and opened a vein at the base of one of the pyramids. The left kidney was in a very remarkable condition; it had a buff-pink or yellow-clay colour, very opaque and dead looking. On section, the whole of the vessels were blocked up with ante-mortem clot, which extended in both artery and vein to the principal vessel. In the trunk vein the clot was non-adherent; in the artery it was firmly adherent, but there was no wound of the arterial coats.

With such extensive damage to the kidney tissue it is impossible to draw any accurate conclusions from this case as to the symptoms due to rupture of the ureter.

The suppression of urine was evidently due to compression of one gland by subcapsular hæmorrhage, and thrombosis of all the vessels of the other. The case, besides other points of interest, affords an illustration of subcapsular extravasation of blood in the kidney, a form of injury to which attention has not yet been specially drawn, but of which I have seen three or four marked instances.

CASE 2.—Coull Mackenzie's case is the only example of extravasation of urine into the peritoneal cavity, due to a subcutaneous injury of the ureter.[2]

It is that of a coolie who was jammed between two heavy trucks.

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[1] *Guy's Hosp. Rep.*, London, 1868, 3rd series, vol. xiv. p. 86.

[2] "Med.-legal Experiences in Calcutta," Edinburgh, p. 98.

There was no external mark of injury. There were two small ruptures, each the size of a pea, in the right ureter. The abdominal cavity contained two pints of urine mixed with blood. The patient died from peritonitis, following the extravasation through the ruptures of the ureter. This case affords no special symptoms beyond such as are caused by fatal perforative peritonitis.

Group B.—Four cases (Stanley's, Godlee's, Chaput's, and Page's), in each of which there was a retroperitoneal collection of urine, were possibly instances of rupture of the ureter.

Case 3.—Stanley,[1] in a paper on rupture of the ureter, records the case of a boy, æt. 9, who was squeezed between the wheel of a cart and the curb-stone. The immediate consequences were contusion of the soft parts around the pelvis, and great pain in the lower part of the abdomen, much ecchymosis and extensive suppuration in the subcutaneous cellular tissue around the pelvis, from which several ounces of matter were discharged by puncture near the left sacro-iliac synchondrosis. By the end of the sixth week these soft parts had recovered, but a large circumscribed oblong swelling was found in the right side of the abdomen. The urine was passed naturally throughout.

From this swelling, fluid having some of the characters of urine was withdrawn by puncture with a small trocar and cannula. The swelling recurred again and again.

It was punctured altogether six times in a period of five months and a half. It refilled again, and extended from the linea alba to the right lumbar region, but further evacuation was considered inexpedient, and the boy was discharged from the hospital nine months after the accident. Subsequently he was often seen in good health, but with the abdominal swelling distinct.

Thus in this case of Stanley's, which, ever since Poland referred to it in 1868, has been quoted over and over again as one of ruptured ureter, we have no proof whatever of the exact part injured, nor of the ultimate result of the injury. It is more likely to have been a ruptured renal pelvis than a ruptured ureter.

Stanley states that by his exploratory puncture he learnt that the fluid was situated immediately beneath the abdominal muscles, and had formed for itself a cavity, by detaching the peritoneum from the abdominal and lumbar muscles. As to the source of the effused urine, he quotes the opinion of Mr. Taylor, who analysed the fluid, "that, owing to the absence of mucus in it, the probable source was high up in the urinary apparatus, as at the commencement of the ureter." This means only that Mr. Taylor did not think the urine he examined had remained in the bladder.

The other case in Stanley's paper is specifically stated by Stanley as being one of ruptured pelvis of the right kidney, the nature of the injury having been ascertained by post-mortem examination.

Case 4.—R. J. Godlee,[2] in an interesting communication in May

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[1] *Med.-Chir. Trans.*, London, 1844, vol. xxvii.

[2] *Trans. Clin. Soc. London*, vol. xx. p. 219.

1887, on "Three Cases of Abdominal Cysts following Injury," recorded the case of a little girl, æt. 4, who had been run over by a cab. Pain, tenderness, and burning in the left inguinal and lumbar regions resulted. Nothing further was revealed until a fortnight had elapsed, when an indefinite swelling in these parts was detected. Within three weeks from the date of injury, this had developed into a large, well-defined, fluctuating tumour, which extended from the iliac spine to the level of the eighth rib, and reached to within half an inch of the median line in front. No change had been observed in the urine. By the aspirator a large quantity of turbid alkaline urine was withdrawn, containing 3 per cent. of urea, much albumin and mucus, a small quantity of pus, and some phosphate crystals. The cyst refilled within two days, to the same size as before. At the end of one month from the date of the injury, an incision was made in the ilio-costal space, and a drain inserted. Then followed a copious and persistent leakage of urine from the wound and a series of pyrexial attacks, so that, at the end of three months and a week after the original injury, lumbar nephrectomy was performed.

Mr. Godlee had great difficulty in finding the kidney, which was situated at the upper and anterior part of the sac, pushed forward with the peritoneum; and great difficulty in removing it, as it was embedded in dense fibrous tissue. The child recovered, but with a fistula.

It was assumed before the nephrectomy was undertaken that the ureter was completely ruptured, "because no blood had appeared at any time in the urine, and if the laceration had been in the kidney it would probably by this time have closed." The history of cases of injury to the kidney shows, however, that these reasons are not sufficient for this conclusion.

The absence of blood in the urine, and the persistence of the escape of urine from the wound prior to the nephrectomy, are symptoms which have often been met with in cases of ruptured renal pelvis.

No description is given of the kidney removed, and one is led to infer that it was taken away piecemeal, and that it was impossible to tell whether the renal pelvis and the renal substance had been injured in the first place or not. There is difficulty in accepting the fistula in this case as evidence that the ureter was torn across; it seems improbable that a detached portion of the tube would cause more trouble than the open end of the ureter, or even a large part of the expanded renal pelvis, which in many cases has been left behind to form part of the stump of the pedicle.

CASE 5.—M. Chaput[1] reported the case of a lad, æt. 16, who is described as having had his right ureter and the back of the cæcum ruptured by a kick from a horse's hock in the right flank. The case was one of great difficulty of diagnosis, and the operative treatment was complicated by opening the peritoneum and the front wall of the cæcum. The surgical wound in the front and the traumatic rupture of from 1 to 2 cms. in the back of the cæcum were sutured, and a large perinephric extravasation was incised and drained through the loin, but subsequently the kidney was removed, because of the persistence of the fistula and the general state of the patient. An examination of the kidney after removal showed it to be in a state of general ascending suppurative pyelonephritis. Its lower extremity was very friable, and bathed in a collection of pus. The renal pelvis was quite intact, and absolutely without sign of rupture, as was also the ureter for a distance of from 1 to 2 cms., but the actual seat and nature of the rupture below this point was not ascertained.

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[1] *Bull. et mém. Soc. de chir. de Paris*, 13 Mars 1889.

It is a question whether the friable, pus-bathed condition of the lower end of the kidney was due to injury which had ruptured the calyces and allowed escape of urine into the surrounding tissues, or whether it was due to changes subsequent to rupture of the ureter.

Case 6.—Herbert W. Page, *Ann. Surg.*, St. Louis (May 1894), reported the case of a boy, æt. 5, who was knocked down on 24th September 1892 by a light vehicle, the wheel of which was said to have passed over the abdomen.

There was no immediate evidence of injury, but within two days blood was noticed occasionally in the urine.

The temperature rose to 100° and 102° on two days, and then returned to normal. Twenty days after the injury the temperature rose again to 100° and 103°, and a swelling formed in the right iliac fossa, accompanied by abdominal tenderness and impaired respiratory movements.

On 27th October the abdomen was opened along the right linea semilunaris, and some clear serous fluid escaped from the peritoneal cavity.

Forty ounces of fluid, having some of the characters of urine, were removed from the swelling behind the peritoneum, the edges of the cyst wall were attached to the anterior parietal peritoneum, and the space drained.

The kidney and upper two inches of the ureter were exposed to view, and found to be uninjured and healthy. The ureter below this part was not visible, and it was concluded that the urine had escaped through a rupture in it lower down.

In November nephrectomy was performed, because of the continued escape of purulent urine from the retroperitoneal cavity, and the high fever. The kidney was then found to be three times its normal size, and in a state of ascending suppurative nephritis, the renal pelvis was distended with purulent urine, and this, as well as the upper part of the ureter, was entire. The bladder had previously been proved by injection to be intact. The child ultimately recovered completely. The actual lesion of the ureter, however, was never seen, and some doubt may possibly be felt about it.

Group C.—The five cases on record in which either abscess-like dilatation of the calyces of the kidney, polycystic disease, or hydronephrosis have been attributed to injury of the ureter, are the following:—

In three of them (Haviland's, Pye-Smith's, and Soller's) it was proved post-mortem that the ureter of the affected kidney was at some point contracted or obliterated, and the history in each case suggests that this might have been caused by an injury to the loin, received at periods of four, two, and nine years respectively before death.

In the fourth case (Cabot's), recovery without a fistula ensued after nephrotomy and drainage. The exact nature of the injury in this case was not ascertained, and it is therefore not possible to say that it was the ureter and not the renal pelvis that was damaged.

The fifth case, Fenger's, was one of subcutaneous injury, followed by stricture of the ureter, and resulting in intermittent hydronephrosis. It was cured by ureterotomy, with closure of the divided wall of the strictured portion by the Heinecke-Mikulicz method.

CASE 7.—In Haviland's case,[1] a lad, æt. 18, sustained a fall on his back from a height of 20 ft., four years before his death. For several years he had been subject to a painful incontinence of urine, great pain in the loins and urinary passages, the urine being throughout charged with pus and sometimes with blood. After death the right kidney was found to have lost all its original structure, and to be converted into a series of sacs, containing pus-like fluid, each cavity being lined with a distinct membrane, which, when separated, preserved its shape. The cavities appeared to have no outlet, and the ureter was atrophied and impervious.

Some doubt must be felt as to this condition being the result of injury rather than of tuberculous disease, especially when we consider the history and the changes in other parts of the urinary organs. Thus the right kidney contained a similar cavity, and the corresponding ureter was considerably enlarged and embedded in fat, in which were a great number of indurated lymphatic glands; the bladder was contracted and its mucous membrane covered with pus, the urethra being in a similar condition.

The parents attributed the boy's illness to his fondness for bathing, affirming that up to his thirteenth year he was perfectly healthy.

The fall seems to have occurred about a year later than this, when the lad was 14, and he only received a shaking, from which he soon recovered.

CASE 8.—In Pye-Smith's case,[2] a young farrier, æt. 24, had been frequently kicked in the abdomen, and on one occasion, about two years before death, hæmaturia of several days' duration occurred after a kick from a horse on the left side, "under the short ribs." He was only in bed three days, and after recovering, till his last illness, felt no inconvenience and had no return of blood in the urine.

The final illness was ushered in with diarrhœa and an abdominal tumour, attended with pain and vomiting. The tumour was tapped more than once, and several pints of opaque reddish fluid containing pus and blood cells were drawn off. Diarrhœa recurred, and ended in the patient's death. On post-mortem examination the kidney was found dilated into a series of sacculi, communicating with each other and with the renal pelvis, and contained a yellow puriform fluid, like that which had been removed during life. A communication had been established between the interior of the kidney and the adherent descending colon, which explained the diarrhœa and the presence of intestinal matter in one of the renal pouches. The ureter was dilated for 1½ in., when it suddenly became contracted, so as not to admit the smallest probe. A few lines further on it again assumed its normal size. Dr. Pye-Smith seems to have taken pains to exclude calculus, tubercle, and other possible causes of the ureteral contraction.

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[1] *Trans. Path. Soc. London*, 1895, vol. x. p. 209.

[2] *Ibid.*, 1872, vol. xxiii. p. 159.

Case 9.—M. J. Soller, Interne des Hôpitaux de Lyon,[1] reported the case of a joiner, æt. 45, who nine years before, during the campaign of 1870, received in the left hypochondrium, below the last rib, a blow from the bursting of a shell, which did not penetrate or even involve the skin. After the injury he felt continually a violent pain on the left side, at the level of the part struck, which was augmented by cold or changes of temperature. A year and a half afterwards his left testicle suppurated, but recovered. The pain in the left hypochondrium led to difficulty in respiration, amounting almost to suffocation, and was accompanied by violent beating of the heart. These symptoms increased up to 1879, when the signs of nephritis developed, and were followed by ascites, anasarca, anæmia, convulsions, and death in August 1880.

At the post-mortem the left kidney was enlarged one-third, and consisted of a congeries of cysts of varying sizes and contents, separated by partitions of fibrous tissue. All the renal tissue had disappeared. There was considerable hydronephrosis, and the renal pelvis was filled with seropurulent fluid. The ureter was the size of a quill pen, with thickened walls, and in the middle of its course it was so contracted as to scarcely admit the head of a pin. At the level of the contraction of the ureter the cellular tissue surrounding was indurated and chronically inflamed. The right kidney was very much congested.

This was not a case of rupture, but of contusion of ureter, I should say. Had there been rupture there would surely have been extravasation. If the conglomerate cystic condition was (and in all probability it was) developed after the accident, it supports the theory of the cysts being due to obstruction, not to an adenomatous change.

Case 10.—Dr. A. T. Cabot[2] reported the case of a boy, æt. 10 years, who for three or four days after falling down stairs passed bloody urine, and several weeks later developed a swelling which increased into a prominent fluctuating tumour, filling the right side of the abdomen.

It was twice aspirated, and large quantities of a clear, slightly yellow fluid, having the characters of altered urine, were withdrawn. The fluid was alkaline, had a specific gravity of 1007, and contained one-fourth of albumin, red and white blood corpuscles, and large round cells in varying numbers. Urea in small amount was discovered at the second tapping. As the fluid re-accumulated, a vertical incision was made in the ilio-costal space, and the cyst wall incised and stitched to the skin. "The finger passed into the cavity felt a soft nodular mass, probably the kidney, in the posterior part of the cyst. The ureter could not be felt." Between two and three pints of amber-coloured fluid escaped, having similar characters to that previously withdrawn, but in addition indican, chlorine, uric acid, and triple phosphate crystals, and round cells like renal epithelium, were noted.

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[1] *Lyon méd.*, 1880, tome xxxv. p. 333.

[2] *Boston Med. and S. Journ.*, 22nd February 1883.

The boy recovered without fistula, five and a half weeks after the operation. This case was reported by Cabot as one of "nephrotomy for hydronephrosis," and the treatment described of the cyst wall, the character of the fluid, and the position on the posterior instead of on the anterior wall of the cyst, of what he took to be the kidney, support this view. There is nothing in the description which is proof of the injury having been ruptured ureter. The case was doubtless one of traumatic hydronephrosis, from blood plugging the ureter.

CASE 11.—Fenger's case was published in the *Chicago Medical Recorder* for March 1893. It is described by Fenger himself as one of "traumatic stricture of the ureter close to its entrance into the pelvis of the kidney," causing intermittent hydronephrosis. The patient, who was 47 years of age, had sustained an injury thirty-four years previously. Hydronephrosis developed ten years afterwards. Lumbar nephrotomy disclosed no calculi. The ureteral orifice could not be discovered through the renal incision; the dilated pelvis was then explored, but still the orifice of the ureter could not be found. The ureter was then isolated, and its upper end found to be embedded in cicatricial tissue for half an inch. Lower down, though small in calibre, the duct was normal.

A longitudinal incision, 1 cm. long, was made in the ureter just below the cicatrix. The stricture itself was 1 cm. in length, and was incised upwards into the renal pelvis. The ureteral wound was then stitched longitudinally, according to the Heinecke-Mikulicz procedure in the treatment of pyloric stricture. No bougie was left in the ureter. A drainage tube was passed into the pelvis through the wound in the kidney. The patient made a good recovery without return of the hydronephrosis. This operation was performed on 26th November 1892.

GROUP D.—Cases usually quoted as rupture of the ureter, but which are really cases of rupture of the renal pelvis, or renal substance opening calyces.

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THE TEACHING OF MATERIA MEDICA.[1]

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In choosing a subject for a lecture introductory to a course of pharmacology and therapeutics, one naturally looks for some theme which is at once new and interesting; and at the present time there is no lack of such, for ceaseless activity is being shown in this department of medicine by numerous capable workers. Indeed, so much is this the case, that complaints are heard even from experts of their inability to cope with the mass of material which is being presented to them. Not only are numerous researches being made on the mode of action of well-established remedies, such as morphine, digitalis, and iron, but new drugs are constantly being discovered and presented to us for clinical examination, while the problems involved in the comparatively recent introduction of antitoxins in the treatment of infectious diseases, of the products of bacteria in the treatment of tuberculosis, and of the treatment by glands and their secretions, open up a wide field for active investigation and speculation. I use the word speculation advisedly, for without employing the imagination, and placing before our minds the possibilities and probabilities of the results to be attained by experiment and research in medicine, we should be left without any adequate aim or guidance in our work. I am well aware that it has often been maintained that an investigation should be undertaken and pursued without any preconceived theory; but this, I venture to say, is an impossibility, for minds constituted as the human mind is, and even if it were possible is not desirable. Its absence would remove from our work the pleasures of hope, of anticipation, and in many cases of fruition, and would certainly diminish the keen interest taken in the work as it progresses and grows under our hands. The most brilliant

[1] Introductory lecture, delivered at Glasgow University.

investigations and discoveries in biology, as well as in other departments of science, have resulted from an idea, followed by a carefully planned investigation, and checked and modified by the results of the experiments undertaken to test its truth. A recent and most striking example of this is the voyage of Nansen to the North Pole, where a carefully thought-out theory led to a brilliant and successful result. In medicine, the localisation of brain disease, followed by surgical interference, affords us another example of the value of theory and scientific research as predecessors of practical progress. To-day, however, I do not propose to enter into any of these more fascinating aspects of contemporary work and thought in therapeutics, but propose rather to give you a necessarily brief and unambitious account of the past state and of the present scope and aims of the subject of Materia Medica and Therapeutics, intending it merely as an introduction to our work for the session. In doing so I especially wish to draw your attention to the close relationship which exists between pharmacology and therapeutics—that is to say, between the study of the action of remedies and practical medicine.

The name Materia Medica is a very old one in our medical schools, so old, indeed, that with the extension of the scope of the subject new terms have been required, and the old name, as used in the Scottish schools, has come to be merely a conventional and brief term to designate a number of closely allied and interdependent branches of medicine. Originally, and even till quite recently, however, the name denoted accurately enough the extent of the subject, which was held to include only a description of the appearance, source, and origin of the substances used in the treatment of disease. An acquaintance with their applications at the bedside, the best means of applying them, and the special forms in which they should be applied, was held to be a department of the practice of medicine, and was taught, or left untaught, by the professor of practice of physic. Anything more dreary to read, it would be difficult to imagine than the text-books on the subject which were put into the hands of students fifty or even fifteen years ago. Take a text-book such as Royle's "Materia Medica and Therapeutics," published in 1847, and much used in its day. To the subject of opium the author devotes 18½ pages, only 39 lines of which deal with the action and uses of the drug, the part which is really of importance to a doctor in practice; the rest of the space is occupied with minute and wearisome descriptions of the different kinds of opium, of its appearance, physical characters, and preparations, and the same plan is followed throughout with other drugs. Further, what is said about the action consists chiefly of a repetition of vague therapeutical terms, which convey no definite ideas to one's mind regarding the reasons for any effects the drug may exercise. No wonder that Charles Darwin looked back at his attendance on lectures on materia medica in Edinburgh as the most inexpressibly dreary experience of his life. This state of affairs is probably to a certain extent responsible for the very languid interest which a considerable section of our profession still manifest towards the treatment of disease by means of drugs.

Still, a book such as Royle's "Materia Medica" shows an immense advance on what had gone before, for even in comparatively recent English pharmacopœias one finds such remedial agents as the oil of dead men's bones, the excrement of dogs (*græcum album*), along with dried frogs, and extraordinarily complex mixtures, such as the famous *theriaca*, which sometimes contained no less than 127 different ingredients. Although from the time of Æsculapius, and probably long anterior, many active and powerful drugs, such as opium, mercury, iron, and scammony, were known and used with precision by physicians, yet alongside this were many curious remedial practices and agents. As in our own day, so at other times, the current theories of pathology have ruled therapeutic treatment to a large extent; and as these theories were often crude, to say the least, treatment was often correspondingly curious. Suffering and disease were attributed to demons, to occult influences, to the moon and stars, to the evil eye and to witchcraft; and accordingly amulets and protective charms were in much request, while "three scruples of the ashes of a witch, when she has been well and carefully burned at the stake, is a sure catholicon against the evils of witchcraft." Queen Anne was the last English sovereign who touched for the king's evil—scrofula. Sir Walter Scott relates that when a child he was wrapped in the skin of a freshly-killed sheep, to cure him of some ailment; and the late Dr. James Ross of Manchester told me that he had actually seen country people in Lancashire swallow young frogs alive, under the idea that they "purified the blood." They took them as a sort of cooling spring medicine. Now, although the times of Scott, and even of Queen Anne, are comparatively near to us, yet, as regards the progress of our ideas in the theory and practice of therapeutics, they are practically mediæval in date. It is within the last sixty years, and more especially within the last thirty of these, that there has taken place the great advance in the exactitude of our knowledge of the action of medicines. This is due mainly to two causes—

1. To advance in our knowledge of the pathology and symptoms of disease, which was soon followed by a healthy scepticism, which demands that whenever curative effects are claimed for any drug or remedial agent, proof of these must be given, and certain measures of precaution taken to test the accuracy of the conclusions. There has been, and is still, too much taken for granted in therapeutics. Mere opinion is often so skilfully presented that we are apt to accept it as fact, and too much stress is habitually laid on the circumstance that sick persons recover while drugs are being administered to them.

Even if they recover many times this is not necessarily more convincing proof, as it is so often held to be, because the medicine may have had nothing to do with the recovery, and a wrong hypothesis is just as false and misleading the thousandth time as it was the first.

2. The birth and growth of what is now called pharmacology. When, about sixty years ago, Magendie and others commenced to systematically investigate the action of medicines, it was soon seen that a fruitful field of inquiry had been opened up, and pharmacology has now taken its place as one of the sciences most directly auxiliary to practical medicine. Its aims may be described as twofold—

In the first place, it contented itself with being what I may call explanatory in its services to practical medicine. Coming on the field late in the day, it found many curative practices in vogue which were of undoubted efficacy. The reasons for these it set itself to explain by careful investigations of the actions of the remedial agents. Success has attended its efforts in the case of such drugs as strychnine and atropine, and most notably, perhaps, in the case of digitalis. Formerly this drug, because it slows the heart, was regarded as having a depressant action on that organ; now it has been proved to have a powerfully stimulant effect, and this conclusion has been reached purely by experimental research. It is patent to anyone that increased accuracy of knowledge in these directions leads at once to increased accuracy of the application of drugs in the treatment of disease. Much, however, still remains to be accomplished; and even in the case of such largely-used remedies as iodide of potassium, mercury, and arsenic, we find that a complete obscurity overhangs the mode in which many of their curative effects are accomplished.

The second great aim of pharmacology is the discovery and investigation of new drugs, and in this connection we owe to it such important and largely-used remedies as nitrite of amyl, chloral hydrate, antipyrin, and strophanthus, besides many others in everyday use. The action and probable scope of employment of all these substances were all worked out by experimental research before they were ever applied to the treatment of disease in human beings. In this field there is still a wide outlet for discovery and research, when we consider that many of our most useful drugs have often untoward effects which limit their usefulness. To take only one concrete example, a substitute for morphine, which would produce narcosis and analgesia without deranging digestion, would be an inestimable boon to suffering humanity.

In the midst of all this activity, it is impossible for the average physician, even if he have hospital beds, to keep himself fully abreast of what is going on. Further, most physicians have been trained as pathologists, not as therapeutists, and the absorbing interest of pathology, together with the great demands made by advances in methods of diagnosis and in the minute study of disease, leave them little time for the severe training necessary to master the methods of research in pharmacology and therapeutics. Hence it seems desirable that every teacher of therapeutics should be in active practice and should have hospital facilities for teaching, as it is only in this way that he can be in sympathy with the aims and requirements of the future practitioners who form the great bulk of his students. As regards the methods of clinical teaching, he cannot differ much from other teachers; but it goes without saying that the chief point of view will be towards treatment. It is necessary in all clinical teaching to ascertain accurately the condition of the patient, and to determine the extent of deviation from the normal; but, having proceeded so far, therapeutical rather than pathological considerations will come to the forefront. It then comes to be considered how far these deviations are capable of being rectified by the means at our disposal, and we find that many of our patients can be restored to perfect health, others can only be relieved, while certain cases are hopeless. The advantage of clinical as contrasted with mere class-room instruction is that, under the eyes of the student, remedial measures are undertaken, sometimes with success, sometimes with partial or complete failure. In either case, however, the student has had an experience, conducted after an exact and careful method, and he learns that the results of treatment are not a lucky chance, but the necessary consequences of knowledge and a carefully thought-out plan. It is certainly of advantage for the young doctor that he should have this experience in his student days, and not after his entrance into practice.

ECTOPIC GESTATION.

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(A Paper read before the Plymouth Medical Society.)

I have selected ectopic gestation as the subject of this paper, partly because it is one of general interest to the profession, inasmuch as we may at any moment be confronted with the condition, and partly because I have had some little experience in its treatment. The pathology is simple. In a healthy Fallopian tube the ciliated lining propels the ovum forwards into the normal seat of pregnancy, the uterus; and at the same time prevents the spermatozoa from ascending into the tube. When, therefore, the ciliated epithelium is destroyed from any cause—such, for instance, as salpingitis—there is a tendency for the ovum to adhere to the smooth lining of the tube. There is also a free access for the spermatozoa, which are endowed with powers of locomotion, and so the ovum retained in the tube becomes impregnated. The enormous trouble which has been expended in describing the various forms of ectopic gestation has much complicated the subject. Experts have minutely described ten varieties; and, as if that were not enough, an eleventh has recently been added. For our purpose it is sufficient for us to consider three only; and even these are more interesting as anatomical curiosities than as being much guide to us in the treatment of cases.

Let us then, first of all, remember that the primary locality of all ectopic gestations is the tube. But it may occur, first, in that portion of the tube which passes into the cornu of the uterus, when it is called interstitial; or, secondly, at the other extremity of the tube, where the fimbriæ embrace the ovary—tubo-ovarian; or, thirdly, between the two extremities—Fallopian. The first variety may be looked upon as by far the most serious, and fortunately the least frequent, as it is the rule that rupture takes place into the peritoneal cavity. The second variety—tubo-ovarian—has given rise to considerable controversy, as many of these cases have been described as ovarian. The probability is, however, in favour of the explanation that the sac has developed among the fimbriæ of the tube, and becomes intimately adherent to the ovary. However, the late Greig Smith considers that there is sufficient evidence for the statement that ovarian pregnancy is a possibility. But whether an impregnated ovum be developed amongst the fimbriæ, or in the ovary itself, is of little practical importance. The third variety—the Fallopian—requires no comment. I will not detain you with any reference to primary abdominal pregnancy, except to remark that two such cases have been recorded—one in which it was supposed that an impregnated ovum escaped through an opening left after Cæsarean section, and a second through the canal left after hysterectomy for myoma. Lawson Tait, however, considers that the ovum could not possibly survive the digestive powers of the peritoneum.

We will now consider the process of development which takes place in a tubal pregnancy. And we may at once take it for granted that sooner or later the result is rupture of the tube.

I cannot, in the space of this paper, enter upon the question of tubal abortion, in which hæmorrhage takes place into the peritoneal cavity, through an unclosed ostium; nor will I detain you at this moment with the consideration of those cases where pregnancy in the tube goes on over the fourth month, except to remark that under such circumstances the pregnancy frequently goes to term, and the fœtus is developed either in the broad ligament or within the peritoneal cavity; in which latter case it is generally enveloped in some adventitious membrane, the placenta either remaining in the tube, or else, if extruded into the peritoneal cavity, becoming closely attached to some neighbouring viscera.

We will at once consider the statement I have already made, that all tubal pregnancies result in rupture of the tube. And the rupture must take place in one of two directions—either into the abdominal cavity, or else between the layers of the broad ligament. In the one case the rupture is intraperitoneal, and in the other it is extraperitoneal. The first class is almost invariably fatal, unless surgical interference is promptly obtained. The second class may develop to full time, may be absorbed as a simple hæmatocele after the death of the ovum, may suppurate and discharge through bladder, rectum, or vagina; or, remaining quiescent, may terminate by mummification or lithopædion formation. Lastly, by a secondary rupture, the fœtus may be extruded into the peritoneal cavity, forming an abdominal pregnancy.

Primary rupture generally takes place before the termination of the twelfth week.

The diagnosis of this condition is by no means easy. Broadly speaking, the accident happens to women who, as it has been said, have an inaptitude for conception—women somewhat advanced in life, who, in their first confinement, have had trouble leading on to tubo-ovarian disturbances. In very many cases they have no suspicion that they are pregnant; whilst some, during the first month or six weeks, have the ordinary symptoms of pregnancy. At the end of this period they are suddenly taken with severe pain, sometimes accompanied with fainting. This attack passes off, only to be followed by others of a similar nature, generally induced by exertion. There is also a frequent discharge of blood from the uterus, and sometimes of decidua.

Upon vaginal examination, we generally find the uterus somewhat enlarged, and deflected to one side or the other. Behind the uterus is felt a soft, boggy swelling, varying in size according to the period of gestation. If pregnancy continues, fœtal movements are detected; the pain and discharge is much diminished, the abdomen enlarges laterally. Then comes spurious labour, with discharge of blood and decidua. The child dies, the amniotic fluid is absorbed, the abdomen decreases in size, and those changes take place to which I have already referred.

It has been asserted that no case of tubal pregnancy can be diagnosed before rupture. And I can well believe it. In fact, even after rupture, in the early days of gestation, it is very difficult to come to a right conclusion until an abdominal section has been performed.

And this leads me on at once to the consideration of the right treatment for these conditions. We will suppose that we have presented to us a condition resembling in all or most of its characters that which I have just described. We are satisfied in our minds that we have to deal with an early stage of ectopic pregnancy, with primary rupture into the broad ligament. Should we in such a case wait on Providence, hoping for the death of the fœtus, and the formation of a simple hæmatocele? Should we adopt any of the temporising methods, such as evacuation of the liquor amnii, the injection of lethal substances, the application of the electric current, or should we at once proceed to cœliotomy?

With regard to the first question, that of waiting, I perhaps ought not to condemn it without compromise; for I have had three cases under my care which have terminated favourably. And yet, with a more extended knowledge, I am of opinion that the practice is wrong and fraught with peril. For, in the first place, how are we to decide that gestation has ceased, and that we have to deal with simple hæmatocele? Whilst we are waiting, it is quite possible that a secondary rupture into the peritoneal cavity may take place, with fatal result. Or we may be tempted into waiting so long as to allow gestation to go on over the fourth month; and it is a well-recognised fact that any operative procedure between that time and the period of false labour is not to be thought of.

As to the evacuation of the liquor amnii, or the injection of lethal substances, both methods have been rejected, on the ground of excessive danger to the woman. There remains the treatment by electricity. And here we have on the one side vehement supporters of the method, and on the other those who are as strongly opposed to it.

I may refer you to a very instructive discussion, reported in the *British Gynæcological Journal*, vol. iv., of which I give you a condensation. The discussion was opened by Dr. Aveling, in favour of the use of galvanism. He condemned the method of galvano-puncture, quoting two cases attended with fatal results. He advocated faradisation, using Gaiffe's induction machine, and placing the negative electrode on the tumour through the vagina, and the positive electrode on the abdomen opposite the tumours. The application lasts ten minutes, and is repeated daily until a marked alteration takes place in the tumour. The theory is that fœtal life is destroyed by tetanic contractions of the heart. The opposition to this plan of treatment, mainly urged by Mr. Lawson Tait, was—(1) The great difficulty of diagnosis in the early stages of ectopic gestation, so that there was no absolute guarantee that the cases were really those of misplaced pregnancy; (2) that, even if the fœtus was destroyed, the placenta would continue to grow; (3) that the use of the faradic current was dangerous, disposing the tube to rupture, owing to muscular contraction; (4) that if the fœtus were destroyed in the later stages of pregnancy, there still remained a dead fœtus to be dealt with.

This is a very condensed but a fair résumé of a discussion which lasted over two meetings of the Society. If I may be allowed to express an opinion, I should say that the "noes have it." If in the three cases of ectopic gestation to which I have referred, faradisation had been used, they would have been claimed as cures by that process. There remains, then, the last course which I have mentioned, namely, cœliotomy. To my mind it seems to be the safest course to pursue. If there is a doubt as to the diagnosis, it is cleared up. The fear of secondary rupture into the peritoneal cavity is removed once and for all, and all the troubles and dangers attending upon advanced gestation are disposed of.

The late Mr. Greig Smith pithily sums up the matter in these words: "Speaking broadly, operation ought not to be left as a last resort; it ought to be ranked as a mode of treatment." We do not hesitate to remove a tube distended with pus; why then should we fear to remove a tube in which lies a fœtus with its placenta, constituting as it does a far greater and more imminent danger to the life of the mother? The following case will illustrate the advisability of not delaying operative measures. I was asked by Mr. Mole of Callington, in June last, to see a patient of his. She had been seen also by Mr. Hingston of Liskeard, and they both came to the conclusion that it was a case of ectopic pregnancy. She was 21 years of age, had been married some little time, but her husband had been away until quite lately. She was supposed to be pregnant, and to be about twelve weeks gone. She had constant bloody discharge. She had recurrent attacks of severe pain, which made her faint. Upon examination, the uterus was found somewhat enlarged and deflected to the right, whilst behind and on the left side there was a soft, doughy mass. I advised an operation; and on the next day, assisted by Mr. Lucy and Mr. Mole, I opened the abdomen. I found a large clot in the peritoneal cavity, fortunately shut off from the general cavity by plastic adhesions. This clot was with difficulty cleared out. Then we came upon a largely distended tube, which was ligatured and removed. On opening the tube, we found it full of clot, but there was no trace of the ovum. Neither could we discover any rupture in the tube. But, on careful examination, we found, about 1 in. from the cornu of the uterus, a well-marked scar about a quarter of an inch long. Immediately outside this was a small sac, about the size of a hazel nut, in which was a large rent. No doubt what had taken place was this: At the point indicated by the scar the tube had ruptured, but fortunately the effusion of blood did not extend on that occasion beyond the peritoneal covering of the tube, which then formed a secondary sac. This sac in its turn ruptured, and blood was extravasated into the peritoneal cavity, happily not enough to endanger life at the moment. Now, we had no reason to suppose that rupture had taken place into the peritoneal cavity. We acted simply on the ground that here was an ectopic gestation, and that the patient's symptoms, especially her recurrent pain and faintness, rendered a delay dangerous. And it was fortunate for her that we did so, for there can be little doubt that at any moment another and probably a fatal hæmorrhage would have occurred. As it was, she was placed in a position of safety, and ultimately made a very good recovery.

Another case under my care in the hospital in August 1896 is a good illustration of the propriety of cœliotomy. The woman was 35 years of age. Fifteen years ago she had a child. One year after that she had twins, and two years after, another child. Then she went on for twelve years, her periods being regular but painful. Her last period was in May. She had constant attacks of hæmorrhage, with pain, but only on 16th August did she pass any clots. The cervix was enlarged, uterus displaced to the left, and pushed up. In the left fornix a mass was felt. The operation disclosed a swelling in the left broad ligament, pushing up the peritoneum, the intestines being closely adherent. The sac was so thin that it ruptured during manipulation, the placenta being extruded. No fœtus was found. The patient made an uninterrupted recovery. I was so impressed at the time of the operation with the exceeding thinness of the sac, and the ease with which it was ruptured, that I had little doubt, if she had been allowed to go on much longer, a secondary rupture would have taken place. The absence of the fœtus and the size of the placenta renders it possible that this might have been a case in which the fœtus had died at an early stage, and the placenta had gone on growing.

Before leaving this portion of my subject, I should like to place before you the details of a case of mistaken diagnosis. We often profit a great deal by the mistakes which surgeons make, if they will only freely confess them. I was asked by a medical man of Plymouth, in April last, to see a lady with him whom he supposed to have ectopic gestation. She was 30 years of age, and had been married twelve months. There was no particular history of menstrual trouble, but she ceased to menstruate on 10th January. She was seen by my friend in the early part of February. She had morning sickness and other signs of pregnancy. In the first week in April she had slight sanious discharge, but pain did not seem to have been a prominent symptom. On vaginal examination, I found the uterus enlarged and deflected to the right. On the left side there was a swelling about the size of a Tangierine orange. I agreed with my friend that it was a case of ectopic pregnancy, and advised an operation. On the day previous to the operation she passed a large clot, which I did not see, but which seemed to give us the missing link in the chain of diagnosis. I operated on her on 10th April, and found she had a small fibroid between the layers of the broad ligament, which I enucleated. I have no doubt that she had a pregnancy in her uterus, and that she miscarried the day before the operation. But I think you will agree with me that it was a curious combination of circumstances, and that we were not altogether without warrant in thinking that the pregnancy was outside the uterus and not in it. I am not singular in my mistake. Dr. Coe of New York reports a case in which he operated with the full expectation of finding a tubal pregnancy. But instead he found a normal pregnancy, with a cystic ovary. This gentleman quotes an observation of Smolsky, to the effect that at six weeks the ectopic sac is about the size of a pigeon's egg; at the end of the second month the size of a walnut; at two and a half months the size of a hen's egg; and at three months of a fist. If this be correct, the remembrance may be of service in making a diagnosis.

I now propose to consider those terrible cases in which the tube ruptures into the peritoneal cavity, and the hæmorrhage, being unchecked by that pressure which exists between the layers of the broad ligament, goes on to a fatal termination. Perhaps it is one of the greatest triumphs of abdominal surgery that these cases are now dealt with successfully by cœliotomy. And yet this lesson requires to be still further impressed upon the profession. For I observe in a recent number of the *British Medical Journal* a case reported, in which ruptured tubal gestation into the cavity of the peritoneum was correctly diagnosed. The patient was seen at 11 P.M., a hypodermic injection of morphia was administered, and ice applied to the abdomen. It was concluded that an operation was impossible at that time, on account of profound collapse, and it was decided to wait until the morning. The patient died at 7 A.M. the next day. It is hardly needful to point out that a woman to whom such a fearful accident had happened could be in no other condition than that of profound collapse, and that this very condition was an indication for the utmost promptitude in relieving it. It has been well remarked that in general surgery it is considered only common sense to ligature a bleeding vessel, no matter what may be the immediate condition of the patient. Would any man in his senses, if called to a case of wounded artery, and finding his patient much collapsed from loss of blood, wait until to-morrow morning to secure the vessel? And yet this case which I have referred to was in all its circumstances similar. It is to Mr. Lawson Tait that we are indebted for the bold method of treatment by cœliotomy and ligature of the broad ligaments—a treatment so successful that it has now become an acknowledged procedure in abdominal surgery. The first case of the sort which I saw was in consultation with Mr. Marcus Bultiel, in 1888. I assisted him at the operation. The peritoneal cavity was full of blood. The left tube was found ruptured, and was at once ligatured and removed. The patient made a good rally, but subsequently died from acute diarrhœa on the third day. I may say that her surroundings were in every respect adverse to recovery.

My next experience was in December last. On 24th December I was asked to call and see a lady in Lisson Grove. There was no urgency in the message, so that I did not see her until about one o'clock. On entering her bedroom I was at once struck with her excessive pallor, and I soon found that she was in a condition of extreme collapse, doubtless, I thought, from some internal hæmorrhage. She was far too ill to tell me much, but I heard enough to satisfy me that she was suffering from hæmorrhage into her peritoneal cavity, occasioned by a ruptured tubal pregnancy. Subsequently, I ascertained her history to be this:—She was 32 years of age, had been married in April last. Up to October she had been quite regular. She then missed a period, but in December she was continuously unwell for a fortnight. She had no particular pain. The day before I saw her she started from Swansea on her journey to Plymouth, and carried a heavy hand-bag up the hill to the station. She felt exhausted, but had no pain. About an hour from Plymouth she felt very ill, but still had no pain. On arrival at Mutley station she walked to her house in Lisson Grove, and, as she had passed no water during the long journey, went up to her bedroom and emptied her bladder. During this effort she was attacked with severe abdominal pain, which lasted all night. Her pulse at 1.30 P.M. was 120 and hardly perceptible, and her temperature 96°. The abdomen was somewhat distended, very tender, and dull on percussion. The vaginal examination was rather negative. There was no bulging into the vagina on either side. The uterus was somewhat fixed, and if anything deflected towards the right. Feeling that every moment was of consequence, I immediately obtained the assistance of Mr. Lucy and Mr. Woollcombe, and by the time we had got our nurses and instruments it was well on to three o'clock. A.C.E. mixture was administered by Mr. Lucy, and as soon as she was sufficiently under the influence of the anæsthetic, 2 pints of saline solution were injected into the left basilic vein. The tube was left in the vein for future use, if required. I then opened the abdominal cavity. Immediately the peritoneum was incised a large quantity of bloody serum was projected quite a foot into the air, flooding the bed. I found the rent was in the left tube, very close to the uterus—so close, indeed, that it was difficult to get a pedicle. The tube was secured and removed, a large quantity of clot was then removed, and the cavity carefully sponged out. During the insertion of the sutures another 2 pints of saline injection were given. The patient made a very good recovery. I saw her a very few weeks ago. She was then about three months pregnant, and in all respects perfectly well. I believe the two saline injections were the salvation of this case, so profound was the collapse from which she was suffering. I have now reached the limit of time allowed me, so that I am unable to deal with some of the other most interesting phases of this condition. I trust, however, that so far we have been able to pick up some few crumbs of knowledge, which may be of service. I said at the commencement of this paper, that at any moment we may be confronted with the accident. It is of the utmost importance, therefore, that we should be able to form a correct diagnosis, and, having done so, that we should also know what to do under the circumstances.

THE SERVICES RENDERED TO PRACTICAL MEDICINE BY BACTERIOLOGY.

By G. V. Poore, M.D., F.R.C.P., *Physician to University College Hospital, London.*

The title of this paper might lead the reader to suppose that I am one of those who are inclined to draw a distinction between science and practice. That is not the case. Science and practice are indivisible; and just as the man of the laboratory is essential for the progress of the practitioner outside of it, so will the practitioner prove invaluable by endorsing or checking the conclusions of the laboratory worker.

The services which bacteriology has rendered to medicine are such as no man can doubt. Those services are linked with the names of Pasteur, Lister, and Koch, and need not detain us here.

A knowledge of bacteriology has immensely altered and improved our point of view of infective diseases, and has had great influence on the measures which we take for the prevention and cure of many of them.

Every advance in pure science increases, so to say, the range of our mental vision. The view which the ancient physician, in the days before Harvey and the microscope, took of a case of "anæmia" must have been very different from that of the modern physician, who not only knows precisely how the blood circulates, and the changes which it undergoes on circuit, but further knows that the blood contains a variety of corpuscles, and that some of these corpuscles carry hæmoglobin, and are themselves liable to be invaded by parasitic hæmatozoa.

When the modern well-informed practitioner is confronted with a case of "anæmia," there is presented to his mind's eye a book with many illustrations, which he turns over *seriatim*, and is generally able to decide correctly, judging by the signs and symptoms presented by his patient, on which page of his mental book the case before him is to be registered. He is too busy to subject each patient to the search-lights of science, notwithstanding that he thoroughly appreciates the value of these searchlights. He is able to make a correct diagnosis in many cases without them, and it is not until reasonable doubts arise in his mind that he has recourse to them.

Every advance in medicine is liable to be over-used at first. Students especially are ready to have recourse to instruments of every kind, and this to such a degree, that I sometimes think that it would be well to allow the student to find out how to use his senses and faculties before he is furnished with those various "scopes," which too often narrow rather than widen the scope of his mental vision.

The hospital physician, especially if the hospital be also a medical school, is in the happy position of being well provided with assistants. He has but to give the order and the thing is done. Let this patient's blood corpuscles be counted, let the sugar and urea be estimated in that man's urine, test the range of this one's field of vision with a perimeter, examine this man's sputa for tubercle bacilli, make a cultivation of the scrapings from that man's throat, and so forth. No man can carry out such investigations unaided, and the most that can be expected of a busy practitioner is to know when such examinations are necessary. Unfortunately, bacteriology is not carried out without a great deal of apparatus—microscopes with immersion lenses and condensers, aniline dyes, incubators, cultivating media, etc. etc.; and it is impossible to keep such apparatus in order unless it is in tolerably constant use.

In the early days of the tubercle bacillus, I thought it necessary to set myself up, in my private house, with all things necessary for staining and examining sputa, and in a certain clumsy fashion I succeeded in showing that sundry patients were or were not harbouring the dreaded parasite. Fervour cools in time; and the finding that some of the numerous reagents were dried up and the bottles empty just when one most needed them, or the being called to other duties just when everything was in train to do the thing properly, with the result that your material was in the staining fluid for ten hours instead of ten minutes, caused one to see that all the minute work might most legitimately be carried out by specialists.

I am one of those who think that specialism is carried to a ridiculous extent, and that the regional division and subdivision of the human body makes not so much for the good of the patient and the advance of science, as it does for the enrichment of the specialist, and the breeding of a certain want of confidence, not always unmerited, between the general practitioner and the consultant. But all the laboratory work—chemical, microscopical, or bacteriological—may very well be carried out by specialists; and the sending, let us say, a sample of urine to the specialist instead of sending the patient *in propriâ personâ*, may not be without its advantages. Signs are not wanting that the laboratory specialist will soon find a remunerative field of work, and that his labours will be appreciated by the profession at large.

The detection of tubercle bacilli in the sputa is sometimes of great service. In the advanced case of phthisis one may feel sure that the disease is pulmonary tuberculosis, and that the bacilli are there, and the finding or non-finding of them in the expectoration would make no difference whatever in our attitude towards the disease. In the early stages, however, the detection of bacilli, enabling us to distinguish between a mild bronchitis and an incipient tuberculosis, may be the means of saving the patient's life, by enabling us to act promptly and efficiently in the very early stages of the disease, when curative measures are alone likely to be really successful. And here I would say that a broad distinction must be drawn between the negative result and the positive result. The positive result—the finding of bacilli—especially if it be confirmed, is most valuable. It is quite otherwise with the negative result, for, one must remember, the bacilli are often very difficult to find; and no man of judgment would think much less gravely of a case until the failure to find the bacilli had been repeated perhaps more than once.

Let me illustrate this by two examples:—

A few months ago I received a report at my insurance office on the life of a young man who was a candidate for insurance. There was a family history (not very bad) of phthisis, and the young man himself had had a mild attack of pleurisy. The medical examiner, however, recommended the life for acceptance at ordinary rates, because the candidate was a fine, healthy-looking subject, without any sign of lung disease, and he added a note to the effect that he had examined the expectoration for tubercle bacilli and had not found any! I immediately recommended that further consideration of the proposal should be postponed until the medical examiner had been communicated with, because, if the candidate was expectorating purulent matter such as alone is likely to contain bacilli, the life must be rejected; and if the examiner had been searching for bacilli in ordinary spittle, his conclusions on other points could only be accepted with great caution, and it might be necessary to ask the candidate to come to London or be re-examined in the country. I rather suspect that this gentleman, in the interests of his patient, was trying to prove too much, and was thinking probably that his negative bacteriological examination would effectually prevent any addition being made on the score of tuberculosis. However, the candidate turned out to be a singularly healthy subject, and it was certain that his "expectoration" did not come from the lungs. I felt inclined to recommend that it should be tested for nicotin.

Another case was that of a patient under my care in University College Hospital, suffering, as I thought, from tuberculous peritonitis, and subsequently from pleural effusion. Both the ascitic fluid and the pleural fluid (they were both clear) were examined for tubercle bacilli, and with a negative result. Nevertheless, when he died, both the peritoneum and pleura were studded with tubercles.

This case enforces what I have said about negative results.

It must be remembered that, while the microscopic search for bacilli is tolerably easy in purulent expectoration, it is much more difficult in some other fluids, and it is by no means uncommon to find nothing of the kind in serous effusions occurring in tuberculous patients.

The examination of the urine for tubercle bacilli is by no means easy, and it is often necessary to supplement a microscopic search by inoculating guinea-pigs with the centrifuged sediment of the urine. The great value of a bacterioscopic examination of the urine may be illustrated by reference to three or four cases:—

The first case occurred not in my own practice, but in that of one of my colleagues, and shows the great value of a negative result. The case was that of a solicitor in large practice who had pus in the urine, together with other symptoms which seemed to point, legitimately enough, to tuberculous pyelitis. He had been advised to give up his profession and to go to South America. Luckily for him he encountered an experienced bacteriologist, who examined the urine by centrifuging and the inoculation of guinea-pigs. This was done five times, and each time with a negative result. Thereupon it became justifiable to explore the kidney, and the result of this was that a calculus was discovered and removed, and the patient turned his back upon Peru, and returned to his office and many thousands a year.

Last year two patients were brought to me, I think on successive days, and they both had one symptom in common, namely, pus in the urine.

The first patient was that of a young country solicitor, who was said to have that rare disease, "diabetes insipidus." The pus was small in amount, and, after examining the patient, I came to the conclusion, by the usual course of reasoning, that the source of the pus was the pelvis of the kidney. This patient looked the picture of health. Thirty years of age, with the figure of an athlete, he was noted as a first-rate cricketer, a capital shot, and a straight rider after hounds. He was the kind of patient to make one feel professional responsibility, for in these days of antiseptics and anæsthetics it would have been possible, should there be reasonable grounds for suspecting a calculus, to ask a surgeon to explore the kidney and remove the offending body.

A few years ago this would have been done at once, for there was a fair chance that this patient had a calculus in the pelvis of the left kidney, and certainly his appearance did not suggest tubercle. But bacteriology was capable of throwing additional light upon this obscure case, and a sample of urine was forwarded to Dr. Harley, at University College, with a request that he would examine it for *B. tuberculosis.*

Microscopically, nothing was found, but the result of inoculating a couple of guinea-pigs afforded slight evidence of tubercle. Accordingly, after an interval of a few weeks, a second sample was subjected to bacterioscopic examination, and now the evidence of tubercle was considerable and undoubted.

With this evidence before us, Mr. Godlee and I decided that no surgical interference was justifiable, and in a very few months this fine young man was dead.

Those who are alive to the dangers of using sounds or catheters in cases where the kidneys are seriously diseased, and those who recognise the discredit which belongs to those who recommend and those who perform grave surgical operations under circumstances which preclude the possibility of a favourable result, will fully appreciate the great services of bacteriology in the practical management of the case I have related.

The second case was that of a clergyman, who had been serving as a chaplain in the Indian service, and was invalided home on account of pus in the urine. He was æt. 26, and looked wretchedly ill. The urine was full of pus, occasionally mixed with blood; the right kidney was enlarged and tender. In this case the search for tubercle bacillus gave, after inoculation experiments on two occasions, separated by an interval, entirely negative results. The likelihood of the trouble in this case being caused by a calculus appeared to be very great, and accordingly Mr. Godlee cut down upon the right kidney, and thoroughly explored it. The pelvis of this kidney was found to be dilated, and to be secreting pus, but no stone was detected either in the pelvis or the ureter, and whatever may have been the cause of the pus, it was clearly not due to tuberculosis or morbid growth. The patient made a good recovery from the operation, and his health improved sufficiently for him to return to India, but, from what I hear, I fancy that the pus is still present in the urine.

This case was not entirely successful; but we were fully justified in exploring the kidney, an operation which did him no harm. In fact, he seemed to improve after it.

The third case was like the first, and need be only briefly referred to:—

The patient was a merchant, æt. 38, whom I saw in conjunction with Dr. Dabbs, of Shanklin, and Dr. Rolf Creasy. There was pus in the urine, combined with symptoms which pointed to the right kidney as the source of the pus. He appeared to be in fairly good health, but had suffered of late from dyspepsia and malaise in various forms, but not sufficient to keep him away from business. Some of the urine was submitted to Dr. Washbourn, of Guy's Hospital, who, after bacterioscopic examination combined with inoculation of guinea-pigs, decided that there was undoubted evidence of tubercle.

This knowledge is of the greatest importance. It shows the doctor what are the probable limits of his art in such a case, and it also protects the patient from the annoyance of a variety of surgical manipulations, which, under the circumstances, would be harmful.

The fourth case was that of a gentleman, æt. 68, who came complaining that he had been suffering from neuralgia, and what he called attacks of "Indian fever," accompanied by occasional shivering and high temperature.

There was pus in his urine, with a history which seemed to point to cystitis and stricture, and for some years he had passed an occasional bougie. The urine was acid and sweet. I asked Mr. Godlee to see him with me, and he decided that whatever might be the cause of the pus it was certainly not due to stricture or enlarged prostate. The symptoms of stone were not marked, but nevertheless it was thought advisable to sound him.

Before doing so, however, we thought it desirable to have a bacterioscopic examination of the urine, which was carried out by Dr. Curtis, the teacher of bacteriology at University College, with a negative result on two occasions.

It may appear to some of my hearers that in ordering a bacterioscopic examination before sounding, we were over-cautious and fidgety. But this gentleman's condition was not urgent; he had had pus in his urine for perhaps months, and he was able to get about and enjoy life. Further, the small expense of the examination was a matter which he could completely disregard. He was æt. 68, and we know that in persons of this age it occasionally happens that instrumental examination of the lower urinary tract is followed by inhibition of the kidney, suppression of urine, and death. This is particularly liable to occur if the kidneys are diseased; and one would not have been free from blame if such an accident had happened in this case, and we had found out post-mortem what we might very well have known ante-mortem.

On sounding him a stone was found, and lithotrity was successfully performed.

Not much need be said about the help rendered by the bacteriologist in cases of diphtheria.

Diagnoses have frequently been rectified by the finding, or not finding, of the bacillus, and this, of course, is an immense gain to the patient, the patient's family, and the doctor in attendance.

Such bacteriological diagnosis can rarely be accomplished in less than a day, and therefore the value of clinical diagnosis remains as important as ever. Making every allowance for exceptional cases, it is true that the diagnosis of diphtheria by the experienced clinician is generally correct. And as success in the treatment of this disease depends, perhaps more than in any other disease, on prompt action, the clinical diagnosis remains of the very greatest importance. It is necessary to say this, because, under the influence of new advances, we are sometimes rather prone to hastily discard old methods; and I can well conceive a young enthusiast, whose experience has been rather that of the laboratory than the ward, being under the mischievous belief that bacterioscopy makes clinical diagnosis unnecessary.

If in a family the practitioner is confronted with a case of sore throat, which he has good reason to think is diphtheria, he will probably administer his dose of antitoxin with as little delay as possible. On the morrow his diagnosis will have been confirmed or refuted by bacteriology, and very possibly he will see a whole family of well-to-do patients gathered into the bosom of the "Asylum's Board," a daily process, which for some inscrutable reason is never spoken of as hospital abuse, notwithstanding that there can be no doubt that the education of the people in the tenet, that disease is a thing for which they are not personally responsible, and for which they may, without disgrace, become chargeable to the charity of others, is at the bottom of many of the professional grievances of which we hear so much.

The diagnosis of diphtheria by bacteriology is not always very easy. The bacillus is polymorphic, and we are hearing of a "pseudo-bacillus," which is puzzling the experts. Further, the results of inoculations are not so striking and certain as is the case with tubercle.

Enteric fever is the third disease in which the bacteriologist is proving a great help to the clinician.

In cases in which the diagnosis of enteric fever is doubtful, what is known as Widal's reaction may be of the greatest service to the clinician; and it has this great advantage, that, provided the material be at hand, the diagnosis may be made in a few minutes. A minute speck of blood is added to a "hanging drop" of a pure cultivation of the *B. typhosus*, and if the patient be suffering from enteric fever, the actively moving bacilli are seen to gradually cease moving, and to run into clumps.

This test has been repeatedly used in my wards during the past year, and in no single instance has the result been doubtful or misleading. Widal's test has been used in many cases in which the diagnosis was not in the least doubtful, but in one or two the clinical evidence of enteric was too slight to enable one to come to a certain conclusion. Widal's reaction showed that these cases were true enteric fever, and in a few hours a majority of the classic symptoms were present.

I have told you nothing which is quite new, but I hope it has not been uninteresting to hear the practical experiences of some new methods from one who is in the fortunate position of being able to obtain a large amount of skilled assistance.

ON THE TREATMENT OF SOME OF THE MORE COMMON EYE AFFECTIONS.

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(*Continued from* Vol. II. *page* 570.)

Blepharitis.—A condition that one is frequently called upon to treat is hyperæmia or inflammation of the lid margin. The inflammation, blepharitis, is met with in very varying degrees of severity, and leads to more or less marked ulceration of the free margin of the lid, as well as, sometimes, of the contiguous skin. Different cases of blepharitis are often classified according to differences in the local pathological changes. From the point of view of treatment, it seems better to recognise, as far as possible, the main differences in etiology. A sufficiently useful etiological classification might embrace three groups, which, however, can hardly be said to be always absolutely distinct.

One of these groups includes the cases of blepharitis which occur for the most part in delicate children, and are often associated at times with attacks of phlyctenular inflammation of the conjunctiva and cornea. Some reference has already been made to these cases. They are cases of what may be called the strumous form of blepharitis. Another group includes the cases which are more or less evidently connected with a chronic catarrhal condition of the tear sac. The last group again comprises those of herpetic or eczematous blepharitis, as the third variety has sometimes been called. In these there is an absence of the strumous element, and usually, at the same time, of any evidence of auto-infection from local sources. They mostly occur in adults, and are often associated with more general eczema of the skin of the lids.

The worst cases of blepharitis belong to the two first groups. The inflammation in them often goes the length of ulceration, and this ulceration leads to greater or less destruction of the eyelashes. In old-standing cases it is common, indeed, to find a complete or practically complete absence of eyelashes. This gives rise to an ugly, red, blear-eyed appearance, which is very characteristic. Short of this there may be an alteration in the colour and character of the lashes, many of those remaining being misdirected, and thus leading sometimes by their inversion to irritation or ulceration of the cornea. The ulcers of the lid margin, as they extend in depth, partially or completely destroy the hair follicles, and then cause these changes in, or the loss of, the eyelashes.

In the treatment of all cases of blepharitis, the first step should be to remove the crusts or scabs which have formed, and to epilate, with the cilia forceps, all the eyelashes which present a distinctly abnormal appearance in their colour, their thickness, or the direction of their growth. The subsequent treatment must depend upon the etiology of the local inflammation, as well as to some extent upon the severity of the changes which have been produced. Sometimes, when the ulcers of the lid margin have become to a great extent confluent, a really satisfactory clearing of the soil for local applications can only be got by first cutting all the lashes off with a pair of scissors. This is comparatively seldom necessary, however. Before attempting to remove the scabs, it is best, in the more pronouncedly impetiginous cases, to apply a starch poultice, in order to soften them. They can afterwards be carefully and thoroughly picked off with a piece of quill, without causing much pain. Until this is done, any epilation that may be required should not be begun. Besides saving trouble, owing to many of the diseased lashes coming away with the scabs, it is then easier to see from the little ulcer pits which lashes it is advisable to pull out. When from the raw surface thus exposed there is found to be an exudation in which there is an evident admixture of pus, which is only rarely the case, and only in the strumous variety of blepharitis, it is well to paint the lid margin over once with a 5 per cent. solution of nitrate of silver, dabbing the solution well in to the ulcers with the camel's-hair brush. This should be followed up by the use, three or four times daily and for a quarter of an hour or so at a time, of compresses soaked in a ½ per cent. solution of the neutral subacetate of lead. After these have been used for a few days, recourse may be had to the yellow oxide ointment. When the blepharitis is associated with phlyctenular conjunctivitis or keratitis, it is best to use the mercurial precipitate, according to the prescription already given. If it exists alone, the following preparation may be used instead:—

℞ Hydrargyri oxidi flavi	grs. x.
Vaselini albi	℥ss.

This should be well smeared along the lid margin morning and night.

Occasionally from neglect, or owing to some particularly marked delicacy on the part of the patient, often from both combined, and always in young children, the lid margin inflammation is not only ulcerative, but is associated with a great deal of deep infiltration, so that the tissues of the lid, and especially the tarsus, are much swollen and thickened. In such cases the ordinary treatment is of no use. As the eyelash follicles are then irretrievably destroyed, and there is consequently no good attempting to save them, the best treatment is to freely scrape away the ulcerated tissues with a small Volkmann spoon, and then undermine the skin and transplant it over the comparatively healthy raw surface which is left.

The general treatment in the case of the strumous variety of blepharitis should be on the same lines as that already discussed in connection with phlyctenular keratitis. Dark glasses should be worn outside in summer, and also in winter when there is snow on the ground. The skin should be kept clean by frequent baths, and cod-liver oil or syrup of the iodide of iron given internally.

In a number of cases of less severe blepharitis, which do not rapidly improve by the use of the yellow oxide ointment, efficiently applied after the scabs and crusts and diseased eyelashes have been removed, it becomes advisable to slit up the canaliculi. This should always be done, as already explained, when any regurgitation of mucus or muco-pus can be got by pressure over the tear sac. But whether such regurgitation be found or not, the little operation is indicated wherever a blepharitis exists for a long time on one side alone. In such a case it often happens that the blepharitis rapidly disappears without any further treatment, although it may previously have resisted other therapeutic measures. There is not, however, the same justification for early interference of this kind in bilateral cases. In them it should not be undertaken, unless there should either be definite evidence of a catarrhal state of the mucous membrane of the tear passages, or a decided rebelliousness to the treatment recommended above.

The eczematous variety of blepharitis, besides being practically only met with in adults, never assumes the impetiginous type which characterises so many cases in strumous children. Hyperæmia of the lid border with a scaly crusting, and sometimes a sort of herpetic eruption, are the appearances presented by this form. In the milder degrees the lid margin has a look almost as if it had been dusted over with flour, although the numerous small scales are hardly as white.

The treatment should consist in frequent bathing with warm water, the lid margins being well rubbed with a wet pledget of cotton-wool. A little zinc ointment may also be smeared on in the morning after the bathing. The following ointment may be used:—

℞ Zinci oxidi	grs. viii.
Vaselini albi	℥ss.

Or the crusts may first be rubbed off with the cotton-wool soaked in a little spirits and water (about one part of whisky to three of water), and then the following ointment rubbed in:—

℞ Ichthyoli	♏ ii.
Aquæ destillatæ	ʒss.
Lanolini	℥ss.

Attention should be paid to the conditions under which the eyes are used, and sources of irritation, such as dust or smoke or impure air, as far as possible removed. Dark glasses are also sometimes useful. Further, it is always advisable to correct any existing error of refraction, especially for near work. In troublesome cases it is well to recommend an anti-gouty diet. It is specially important to knock off alcohol, particularly, as is often the case, it happens to be more freely indulged in than necessary.

A condition which is often complained of, and generally more on account of its unsightliness than for any great discomfort to which it gives rise, is a sort of blind pimple of the lid margin. Usually there is only one, though occasionally there may be several, elevations of this kind at different parts of the margin. The pimple appears as a uniformly red conical elevation. Its base occupies mostly the portion of the flattened lid margin, which is in the neighbourhood of its free outer edge. Often there are epithelial squames at other parts, indicating a slight degree of blepharitis, but this association may be quite absent. These pimples occur mostly in adults, and often in cases which present more or less evident arthritic symptoms.

The question of treatment has most often to be considered in the case of ladies, who are often sensitive as to the disfigurement which the condition causes. No doubt there may be some degree of local discomfort as well. The actual disfigurement depends partly upon the size, of course, but mainly on the degree of congestion which the little prominences present. The natural duration of the pimples is variable. They may only last a few weeks, but often they remain in much the same state for many months. Usually, however, in the chronic cases, the redness, which at first is marked, tones down to a great extent, so that the adventitious tissue assumes nearly, if not quite, the colour of the rest of the lid margin, and consequently becomes much less apparent. On everting the lid there is always found to be a little circumscribed area of hyperæmia of the conjunctiva, roughly triangular in shape, with its base directed to the portion of the lid margin on which the pimple has formed. In chronic cases there is always to be seen a yellowish streak coursing down the middle of the hyperæmic patch. This is simply a Meibomian duct blocked with secretion which has become more or less calcareous. Even in recent cases it is usual to find a degree of transparence in the middle of the congested conjunctival area, behind which some whitish secretion in the duct shows itself.

The treatment consists in emptying out this retained secretion. This can be done at first by simply pressing the affected portion of the lid between the two thumb nails, which causes the natural exit at the lid margin to burst open and give escape to a sebaceous-looking secretion. In cases which have lasted for some time it is necessary to incise from the conjunctival surface, making the cut along the yellow streak referred to, and up to the base of the pimple, and then to press out the contents. The pimple itself in either case then quickly disappears. In recent cases it almost immediately loses its hyperæmia, and this of itself is always a cause of satisfaction to a patient who has been mainly annoyed by the unsightliness which it has produced. Not unfrequently there are found to be other little patches in the lid of the same nature, though rarely as large, but which are not complicated by the protrusion at the margin. These should be treated in the same way, and preferably at the same sitting. An astringent lotion may be used for some time afterwards. Any of those referred to in connection with simple conjunctivitis is suitable.

STYE.—The stye is essentially a furuncle of the lid margin. The inflammation arises in the sebaceous glands surrounding an eyelash, no doubt as the result of some form of infection. As a rule there is little difficulty in recognising a stye. Sometimes, when the inflammation surrounding the eyelash bulb has caused very considerable œdema of the lid and chemosis, and particularly if the stye is situated near the outer canthus, the cause of the œdema may not be so apparent. The site of the pain on pressure is then of importance in enabling one to arrive at a diagnosis. There is, for instance, no pain caused by pressing on the sac—which excludes dacryocystitis; nor any pain on deep pressure over the orbital margin—which enables one to exclude periostitis. On running the finger, however, along the lid margin, or on grasping the lid border between the fingers, a sharp pain will be felt when the disturbance is caused by the presence of a stye.

The acute localised inflammation comes to a point somewhere on the margin of the lid, and thus differs from a suppurating tarsal cyst, which invariably points on the conjunctival or skin surface.

The treatment in the case of styes has to be both palliative and prophylactic. At first warm compresses of lead lotion (a 1 per cent. solution of the neutral subacetate), or of alum lotion (4 grs. to the ounce of water), may be used. When the stye has begun to point it should be incised. In doing so, a small opening is made in the long direction of the lid margin. Afterwards the thick matter may be squeezed out by pressure between the forefinger and thumb, and a poultice applied. When crops of styes appear simultaneously, or several come on one after another, to which in most cases there is a more or less marked tendency, it is important to take the patient's general health into consideration. Usually he is found to be run down, or to be suffering from some gastric derangement. A short course of aperient water, preferably a natural water, such as Apenta, Franz Josef, or Hunyadi, should be prescribed, and followed by a tonic of iron and quinine. This treatment is generally efficacious; but special indications may be present in some cases, as where the diathesis is either markedly strumous or markedly arthritic or gouty. In all cases it is well to use the following ointment as soon as the acute inflammation has subsided:—

℞ Unguenti hydrargyri nitratis (B. P.) . . .	ʒss.
Vaselini albi	℥ss.

This should be smeared along the edges of the lids of both eyes night and morning. It may be said to have almost a specific action in preventing the recurrence of this troublesome and painful form of inflammation.

TARSAL CYST.—A very common cause of circumscribed swelling in the lid is a retention cyst in the Meibomian glands of the tarsus. The retention gives rise to an inflammatory new growth, the size of which may vary greatly. After having attained to a certain stage in its development, the tarsal cyst tends to become inflamed. The inflammation may be associated with considerable œdema of the whole lid. It always then causes more or less pain, though the inflamed tarsal cyst is not so painful a condition as a stye. The inflamed cyst not unfrequently bursts of itself. When this happens, it always does so at some point on the conjunctival surface. More often, after persisting for two or three days, the inflammatory symptoms subside, and the swelling diminishes in size, leaving only the hard lump which characterises the chronic cyst in this situation. A tarsal cyst may occasionally undergo spontaneous absorption, either with or without having become inflamed. This result is, however, so uncommon that it need not influence the treatment, though it is well to remember from a prognostic point of view.

The cyst may occur in any part of the thickness of the tarsus, and may, as it increases in size, extend either towards the conjunctival or skin surface of the tarsus. It is easily felt as a firm mass, over which the skin is freely movable. Most frequently it is not long before the adjacent conjunctiva is found, on eversion of the lid, to be altered in its appearance. A darker, somewhat translucent, coloration, and sometimes a more or less evident localised prominence of the conjunctiva then marks the position of the cyst.

The treatment which should be adopted is to incise the cyst, shell out its contents, and afterwards break down its capsule or wall. Generally it is best opened into from the conjunctival surface. The incision in the conjunctiva should be made in a radial direction, at right angles to the lid margin. It should freely open into the cyst through the discoloured portion of the conjunctiva. By then pressing the lid between the thumbs of either hand, the cyst contents are squeezed out. With a small metal scoop any remaining débris may be shelled out, and at the same time by a little rough scraping with the same instrument the sac wall be sufficiently destroyed. Too much or too rough scraping is apt to cause an unnecessary amount of ecchymosis. In the less frequent cases in which the cyst mainly extends towards the outer surface of the tarsus, and thus comes nearer to the skin of the lid, the incision may be preferably made through the skin. It should then be made parallel to the lid border, and followed by the same manipulations as just described. An incision in this situation and direction leaves practically no noticeable scar, owing to the natural wrinkling of the lid skin.

There is no certain means of preventing the subsequent recurrence of the tarsal cysts. If the little operation described has been properly carried out, there is never any recurrence at the same spot, but in many cases there is a decided tendency for other portions of the tarsus of both upper and lower lids to become the sites of other cysts. Often a considerable time—it may be years—elapses between the formation of one cyst or one crop of cysts, as it is common to find a multiple development at the same time, and the appearance of others. Occasionally, if the condition is observed when just beginning, the cyst may be dispersed by pressing the lid firmly between the forefinger and thumb. This treatment is generally only applicable where, while treating one or more fully-developed cysts in the ordinary manner by incision, others are found to be present which are just in process of formation. Otherwise, it is seldom that one has an opportunity of putting it in practice. No doubt the cleansing, too, of the conjunctival sac once or twice daily with boracic acid solution is a useful precaution to take. For instance, the lotion may be used in the morning after the secretions have to some extent become retained during sleep, and again at any time, as on a dusty day, that there has been some more than ordinary cause of irritation. The occasional use of a mild astringent, such as the tannic acid solution, referred to in the treatment of conjunctival hyperæmia, may be also recommended.

ECTROPION.—A greater or less degree of eversion of the lids is a condition which has often to be dealt with. This ectropion, as it is called, may, from the points of view of both etiology and treatment, be considered as occurring in two varieties—conjunctival and cicatricial ectropion. Conjunctival ectropion can always be satisfactorily treated. Much can also be done for cicatricial cases, but the blepharo-plastic operations, which are required wherever there is a loss of lid skin, are far from giving, as a rule, results which are comparable to those got in the simpler purely conjunctival cases. Moreover, much depends upon the kind of operation which the particular circumstances of each case render available or most suitable.

In the so-called conjunctival variety of ectropion the skin of the lid is either altogether normal, or only slightly eczematous, as the result of being frequently irritated by overflowing tears. It is mainly met with in old people, and then principally and always in the marked degrees in the lower lid. Occasionally one sees a great amount of eversion of the conjunctiva of the upper lid in young children. These cases arise from long-standing conjunctivitis, with great œdema and blepharospasm. They do not call for any special treatment, so far as the ectropion is concerned. This disappears of itself with the subsidence of the other symptoms. The main point to note in connection with the ectropion which we are now considering, is the ease with which the practically normal condition of the skin enables one to hold the lid back in its proper position with one's fingers.

A conjunctival ectropion is only slowly developed. It makes its appearance in cases of old-standing or neglected blepharitis and conjunctivitis. The thickening of the lid margin and swelling of the conjunctiva and subconjunctival tissue, to which this chronic local inflammation gives rise, is further complicated by a deeper infiltration, which impairs the function of the palpebral fibres of the orbicularis muscle. These fibres consequently fail to keep the lid properly applied to the eye, and it becomes everted. With the comparatively slight eversion which occurs at first there is associated a degree of epiphora, owing to the outward displacement of the lower punctum lachrymale. The further increase of the ectropion is then favoured by the hardening and thickening of the everted conjunctiva, the excoriation of the skin caused by the overflowing tears, and no doubt also by more complete loss of power of the muscle fibres.

The treatment suitable for cases of conjunctival ectropion depends mainly upon its degree. Where the malposition is only slight, the lower canaliculus should be slit up into the tear sac in the manner already described. This to a great extent gets rid of the epiphora by admitting of a better excretion of the tears. Any crusts which may be present on the lid margin and on the surface of the everted conjunctiva must also be removed. The conjunctiva is then painted over once daily with a solution of nitrate of silver (5 grs. to the ounce of distilled water),and a zinc ointment (see p. 53) smeared night and morning along the lid margin, and also rubbed well into the skin of the lower lid.

The same treatment may also be tried in the first place for moderate degrees of ectropion (up to 3 or 4 mm. in depth of exposed conjunctiva). It is generally necessary, however, in such cases to combine with this treatment the excision of some of the swollen and redundant conjunctiva. The portion of conjunctiva removed should equal in breadth that of the everted portion, and should be taken in such a way that the highest-lying everted conjunctiva forms its mid-line. Three or four stitches may then be applied. It is important to remove the conjunctiva well up to the inner canthus.

Higher degrees of ectropion should not be treated in this way, as it is not advisable to cut away too much conjunctiva. Two other methods of treatment, which may be employed either singly or, in excessive ectropion, combined, are then more suitable. These are Snellen's thread operation, and the excision of a triangular portion of the whole thickness of the lid, or of the skin alone, from its outer angle. Snellen's operation consists in passing loops of thread from the conjunctiva below the skin of the lid in such a way that, on tightening the threads, the everted portion of the conjunctiva is drawn upon and caused to turn inwards. Subsequently the mechanical effect of the threads is, on their removal, maintained by cicatricial bands, which form in the tracks they have made. The steps of the operation are as follows:—A stoutish waxed and aseptic silk thread is armed with a needle at either end. One needle is entered at a point midway along the ridge in the conjunctiva which marks the highest part of its eversion. It is then passed outwards, and when felt just under the skin is directed downwards in the subcutaneous tissue of the lid, and brought out at a point 1 in. or more below the lower orbital ridge. The second needle is entered through the same ridge of conjunctiva, and close to the point of entrance of the first (about 2 mm. from it). It is then carried along parallel to the direction of the other end of the thread, and finally brought out close to it. This forms the loop. Two other loops are placed in the same way on either side of the first. The three loops are then knotted firmly over pieces of drainage tubing. The threads are allowed to remain *in situ* for two to four days, according to the amount of reaction which follows, and are then removed. This little operation, when properly performed in suitable cases, is most satisfactory, and if the canaliculus has been slit, and the treatment of the chronically inflamed conjunctiva continued for some time, there is no risk of relapse. The appearance immediately after removal of the threads is often not very good, as, although the ectropion is overcome, there may be an unsightly degree of thickening of the lid, which at the same time is unnaturally withdrawn from the eye. In the course of a week or two, however, the parts regain a practically normal look, the only difference being that the lid skin is not so soft or wrinkled as it normally is.

Two points should be remembered in performing Snellen's operation—(1) It is absolutely essential that the threads should be introduced at the highest points of the everted conjunctiva, and not from the bottom of the conjunctival sac, as seems sometimes to be done. (2) Again, the knotting of the threads must not only at the time counteract the ectropion, but must also produce an over effect, and cause a considerable degree of inversion, in order to afford a proper guarantee of a permanently successful result.

With regard to the other operation referred to, as suitable in higher degrees of conjunctival ectropion, it will often be found that there is apparently a redundancy of skin in these cases, and that mere tightening of the lower lid by pinching up the skin at its outer part, will cause the everted conjunctiva to roll inwards into position. This effect can be rendered permanent by the removal of some of the skin. It is best to remove a piece from the outer part of the lid, and not from the middle as is sometimes recommended. The base of the triangular piece to be removed is formed then by the outermost portion of the lid margin. Two snips with a pair of strong scissors, made from the lid margin, and converging to a point about $\frac{3}{4}$ in. below it, is all the cutting that is required. After the bleeding has been sufficiently arrested, by pressure and torsion, two or three sutures are applied to bring the lips of the conjunctival wound together, and then a few deeper external ones to unite those of the skin wound. Healing always takes place by first intention, and nothing could be better than the effect of this proceeding, provided a sufficiently large portion of the lid has been removed. It leads more rapidly to a restoration of the normal appearance of the lid than Snellen's thread operation, but has the disadvantage of requiring some experience, in order to be able to estimate properly the amount of tissue which should be removed in order to get the full effect.

In the highest degrees of conjunctival ectropion, as big an effect as can be got, without the removal of too much skin by this operation followed by Snellen's, will rarely fail to give a satisfactory result. In any case where the two operations are combined, they should be done in this order, as the skin excision method requires the absence of any cicatricial formation, to admit of the full effect which can be got from it.

(To be continued.)

THE MEDICINAL TREATMENT OF RHEUMATOID ARTHRITIS.

By Gilbert A. Bannatyne, M.D., M.R.C.P.Ed.,
Hon. Physician to the Royal Mineral Water Hospital, and to the Royal United Hospital, Bath.

Unfortunately for a large class of sufferers, certain forms of rheumatoid arthritis have hitherto proved not only incurable, but also almost impossible to alleviate. Latterly, however, so far from this being the case, I believe all cases, if seen early, can be cured, or if, in the later stages, not cured, yet the attack can be arrested and further damage prevented. Where the disease has already given rise to much disorganisation and destruction of the joint tissues, both soft and hard, of course we cannot renew them and make them as of old, but we can, having arrested the further development of the morbid process, alleviate suffering, and by improving the patient's condition generally, give greater ease and bodily comfort, and enable him in a modified sense to enjoy the use of the affected joints. This satisfactory result has been brought about partly by newer methods of treatment by drugs, and partly by the use of old and well-understood methods of dieting, bathing, massage, etc. It is not the latter forms of treatment that I would at present draw attention to, but to the properties of certain drugs which I have found generally useful.

Believing that the disease was due to a micro-organism, the nature of which was described in the *Lancet* for 25th April 1896, and failing an antitoxin, I was led to employ a number of the newer drugs, possessing high eliminative powers, many of which have been found useful in other microbic conditions. I refer more especially to those belonging to the phenol group of antiseptics, and the chief drug of this group which I have found useful is creasote, or some of its compounds or derivatives. As creasote and its active principle guaiacol, on internal administration, produce symptoms of great intestinal irritation, owing to their caustic and albumin-coagulating powers, one in practice is led to use some of their compounds which are free from this drawback, and, luckily for humanity at large, we have three well-known drugs which are available. These are creasotal, guaiacol carbonate, and benzosol. These are easily administered, and invalids readily retain them, probably owing to the absence of all repulsive smell and taste, as well as to the absence of the caustic and poisonous properties so marked in creasote and guaiacol. At the same time, we must remember that absorption takes place in the intestines and not in the stomach, and that this absorption is gradual.

1. *Creasotal* or *carbonate of creasote* is formed by the combination of creasote and carbonic acid. It is an oily substance with an oily flavour, but almost free from odour. It contains about nine-tenths of its weight of creasote, at ordinary temperatures is viscous, at slightly higher ones limpid, is insoluble in water, but soluble in alcohol. The dose is 5 minims daily, increased to about 20 minims, as the patient becomes accustomed to it. It may be administered in capsules, or else made into an emulsion with the yolk of an egg. In the intestines it decomposes into creasote and carbonic acid.

2. *Guaiacol carbonate* is an insoluble, tasteless, odourless, white crystalline powder. It contains 90·5 per cent. of guaiacol combined with carbonic acid, its melting point being 86° C. It is devoid of all smell, has no caustic action, and is completely neutral to the mucous membrane. It decomposes slowly in the intestines, yielding guaiacol, which is rapidly absorbed, and carbonic acid. In fact, within half to one hour after ingestion, the guaiacol can be traced in the urine. It is easily taken by the mouth in the form of powder, or preferably in cachet or pill. Given in doses of 5 to 15 grs. three times a day, rapidly increased to six times, its effect is soon marked.

3. *Benzosol* (*benzoyl-guaiacol*), $C_{14}H_{12}O_3$, is a tasteless, odourless body, which splits up into guaiacol and benzoic acid in the digestive tract. It is insoluble in water, slightly soluble in glacial acetic acid, and soluble in chloroform, ether, or hot alcohol. It splits up slightly in the stomach, but does so entirely in the small intestines. The dose is 4 grs. three times a day, increased to six as the patient becomes used to it.

Of these three compounds I now almost entirely use guaiacol carbonate as being the most reliable, easily taken, and as giving the best results. Benzosol is feebler in its action, and does not produce an effect so quickly, but its slightly cheaper price is of advantage in some cases. Creasotal, being an oily fluid, is objected to by many, so that it has come to be my routine treatment to employ the guaiacol carbonate compound. Given, then, as described, its effect is soon marked. The patient almost from the first begins to improve, the pains become less, the swellings diminish, and the heat of the skin over the joints goes, the general body temperature falls, the facies, so noticeable in marked cases, becomes less pronounced, and, in fact, so obvious is the improvement, that the patients often say they feel quite different beings. That the circulation is improved we readily see, for we have no longer the cold, dripping, blue and asphyxiated-looking hands, but they have become warm and almost natural in hue. Patients who have been incapable of moving can now do so, possibly with a stick, but often without. They are no longer subjects of insomnia, and their food is taken with relish, and is properly assimilated. I do not say these results are gained in a day; on the other hand, they may only result after prolonged and constant care, but that they do occur is infinitely more encouraging than what we have been taught to expect. Some few cases appear to resist all treatment, but even these often write long after they have left Bath, and state that their improvement has progressed continuously, and therefore we have come to be much more hopeful in all cases. Even in the advanced cases, with great destruction of tissue, constant care and the free use of guaiacol, combined with bathing and dietetic regimen, will ultimately subdue them. That the improvement is permanent, I believe, but it is too early to say definitely. The only complication which at present seems to tell against the free use of guaiacol carbonate is nephritis, and this we understand when we consider that it is through the kidneys that its elimination takes place. I am not as yet quite convinced of the danger of guaiacol, even when there is nephritis, but as yet the evidence is very contradictory. Equally good results have been obtained with the other drugs, but, for the reasons already mentioned, I do not use them so largely.

With regard to the mode of action of these drugs, it would appear that they have no specific action on the bacilli themselves, or on their toxin-producing powers. They act locally on the alimentary canal before absorption, and afterwards, by favouring the elimination of the toxic albumins with which they combine. Of course, owing to their very rapid decomposition, they can have little local intestinal action. It is known that the guaiacol leaves the body by the kidneys as an ethereal sulphate, showing that after decomposition has occurred the guaiacol is absorbed, and that it combines with the sulphur of the albuminous constituents of the blood. This combination must occur with such substances as most readily lend themselves to chemical combination, and, as having such properties, are the poisonous toxic albumins which are produced during the life-cycle of bacteria. The compounds of guaiacol with the products of bacteria are readily acted upon by the oxygen of the blood, so that the guaiacol, together with the sulphur of the albumin molecule, is separated out of the compound, and is oxidised to guaiacol sulphate, while the remainder of the molecule of albumin is still further decomposed. These products are removed from the blood, chiefly by the kidneys. In this way the blood is being continuously depoisoned by these substances; or, in other words, it is being continuously freed from the constant new formation of bacterial toxic products, and the system is enabled to recuperate until it is in a condition not only to neutralise but to destroy the micro-organisms themselves.

Combined with the above for internal administration, I use for external application, in varying proportions, pure guaiacol and olive oil. When applied thus, it at once produces a feeling of numbness, not only of the skin over the joint, but it also relieves the pain in the joint itself. It gives rise to a sense of coolness and a feeling of relief. This effect varies with the strength of the solution used and its frequency of application, and it becomes more marked with every application, whilst the joint condition improves in the most unexpected way. But, above all, the great thing is the relief from pain and the reduction in the joint temperature. It was first used as an application in rheumatic joints by M. Desplats. He used equal parts of guaiacol and glycerin painted on to the joints, and covered in with a dry dressing. In three cases of arthritis deformans, he says, the results were excellent. Da Costa says oil of cloves is the best substance to mask its odour, which some find disagreeable. Stolzeburg[1] says that guaiacol, applied externally, produces profuse sweats, which it is unwise to continue. I have seldom seen these sweats, and they have never been troublesome. It is said to increase the flow of urine, and reduces the body temperature, according to MM. Linossier and Lanois,[2] as much as 2°.

As a rule, I apply it in equal proportions with olive oil, painted on to the affected joints nightly. If smell be objected to, 5 to 10 minims of oil of cloves to the ounce masks it to a certain extent. If the pain in the joints be very severe, it may be applied night and morning, and, as the patient becomes accustomed to it, the paint may be increased in strength. If painted on too strong it is apt to blister the skin, but, so far I have found, no evil effects arise from thus blistering the parts. Should it produce local erythema or pustulation, as it occasionally does, it has been my habit to withdraw its use for a time. So far I have observed no evil constitutional effects, and it is stood well by the old and young alike. Should it be desirable to produce some counter-irritation of the skin, it can be combined with the tincture of iodine in varying proportions. My experience, however, does not lead me to expect more benefit from this than from the guaiacol and olive oil alone.

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[1] Stolzeburg, *Ber. klin. Wchnschr.*, 1894, No. 5.

[2] Linossier and Lanois, *Union méd.*, Paris, April 1894.

I give the following report of one of the worst and most acute though typical cases I have ever seen. The patient for part of the time could not bathe, so the waters alone could not account for the improvement.

J. M., æt. 12, male; admitted 25th July 1895 to the Royal Mineral Hospital, suffering from rheumatoid arthritis. Family history, as far as known, was negative with regard to rheumatism, gout, or phthisis. Twelve months previous to admission he suffered from an acute arthritic attack, diagnosed as acute rheumatism, which was supposed to be the starting-point of present illness. On admission, patient lay helpless, emaciated to a degree, panting, and apparently moribund. There was the peculiar cachectic, anxious facies; the eyes were prominent, with widely dilated pupils, and the whole body was bathed in sweat. The hands and feet were bluish, cold, and dripping with perspiration. There was extreme rheumatoid degeneration of the hands, and the doughy-looking fingers were distinctly reddened and inflamed. The right shoulder, neck, jaws, hips, knees, and ankles were also severely affected. The axillary glands were enlarged—distinctly so—but the spleen appeared to be normal. There was a tendency to roseolatous patches about the trunk. There was no albumin in the urine, sp. gr. 1018. Heart apex beat in normal position, systolic bruit over mitral area and at third left costal cartilage, pulse 126, weak and thready.

The patient was so ill that I daily expected his death. He could not move himself, and, owing to the pain from pressure, he had to be lifted and moved on to the other side every half-hour by the nurses. The slightest voluntary movement gave him intense pain, and there was a tendency to the formation of bed-sores. He was too ill to be bathed, or, in fact, carry out any thermal treatment. On 31st July I put him on guaiacol carbonate, 5 grs. three times a day, and guaiacol and oil were painted on the affected joints. The temperature almost immediately fell, and he began to improve in every way. This continued till the 8th August, when somehow he got a cold, which on the 14th assumed a low pneumonic type. For some days he lay at death's door, but gradually rallied, and became convalescent from the pneumonic attack on or about the 23rd. On the 24th the guaiacol treatment, which had been suspended during this attack, was resumed. He now slowly improved with regard to his rheumatoid condition, gained flesh, and lost his pains. On 30th August his weight, which on 5th August was 3 stones 4 lbs., had increased to 3 stones 6 lbs. On 17th September he was well enough to begin his thermal treatment, and thereafter his condition rapidly improved. On 26th September he was able to dispense with the water-bed. On 31st October the improvement was most marked both physically and mentally. The patient, who was too weak even to sit up at first, could now walk slowly down the ward without help. All heat and redness of the joints had gone, and he had absolutely no pain. Movement in the affected joints was fair, and was daily becoming better. His appetite all along was good. His weight was now 3 stones 8½ lbs., and was steadily improving. A more remarkable case I never saw. All who saw him were of the opinion that the disease was checked by the guaiacol, and we cannot too much regret the onset of the pneumonia, which had a markedly adverse effect on him. The thermal treatment consisted in baths, followed, as he improved, by gentle rubbings and manipulations of the muscles.

This case shows one must never give up hope, and what may be done even in the most extreme cases. A photograph, taken towards the end of September, showed well the still marked swelling of the fingers. Those of the right hand persisted longer, and were worse than those of the left. I would also draw attention to the peculiar and characteristic facial appearance, brought about partly by swelling in the jaw joint, and partly by muscular atrophy.

The full report of such a case is interesting from many points of view, and none more so than from the result, and I feel it is needless at the present time to multiply cases successfully treated, or to do more than indicate what results have been obtained. It is, of course, a question how much the thermal treatment lends its aid to the total benefit derived by a course of treatment carried out as I have described, but I can positively state that the combined treatment, by drugs and by thermal waters, is infinitely superior to what is got by waters alone. Whether the drug treatment alone will answer as well, I cannot say, and, looking at the nature of the disorder, I doubt it. Patients present themselves here in the hopes of deriving benefit from the waters, and I have not, so far, felt myself justified in withholding them from them. But it is with every confidence that I would now draw the attention of those interested in this disease, and in a position to carry it out, to this plan of treatment, and to the results obtained therefrom.

ON HYPNOTISM AND CRIME.

By A. Stodart Walker, M.B., F.R.C.P.Ed.

In a valuable paper "On the Evolution of Hypnotic Theory," contributed to the winter number of *Brain*, Dr. Milne Bramwell discusses at some length the subject of the relation of hypnotism to crime, particularly in relation to murder, and adds, that there was only one instance in which an imaginary crime had been carried out by one of his patients. "All others, without exception, have absolutely refused such suggestion." Before, however, the evidence, valuable as it is, of Dr. Bramwell is to be accepted as final in regard to this important medico-sociological question, it seems to me that we must examine much more carefully into the question of the nature of the crime suggested, and into the psychical state involved in each case. In each of the cases mentioned in the course of Dr. Bramwell's paper, the crime is one in which there is seemingly no question of *direct personal self-defence*, and herein it appears to me lies the gist of the whole matter.

Let me explain more fully what I mean. The mere suggestion that the hypnotised subject should commit an experimental crime, against some person or persons, for no given reason except that perhaps "she has lived long enough," or the like, would most likely be met with a refusal, if the patient happened to be of a nature wanting slightly in a sense of humour, or with an affirmation, if the hypnotised subject was anxious that the experiment should be a success. Invariably in my own cases I have found these results. But there is a much more important kind of case which I have carefully studied, and which should not be lost sight of. That is the kind of case in which the suggestion to the patient comes in the nature of self-defence.

It is quite true that the hypnotised subject will not, in the majority of cases, project himself in any direction contrary to his general moral tendency, when the projection is concerned with an interference with something not involving directly the safety of his own personality. But a suggestion which involves the safety of his own person has a different effect altogether. The first law of nature, self-preservation, is nowhere more strongly emphasised than in the hypnotic state. The suggestion in this case is only being pushed along the lines of the normal in nature.

And, in pointing this out, I am not even throwing into the balance the notorious fact that, speaking roughly, one out of every three persons is a born criminal. A very large percentage of people are criminals by nature, but whose criminal tendencies are inhibited by their social environment.

There is an equally large percentage whose tendencies have been inhibited, either by personal endeavour, recognition of social moral responsibilities, or perhaps by the adoption of some form of systematised belief, or by even a higher form of inhibition than all these.

Into the balance, more important still, might be thrown the occasional criminal, who requires the casual provocation, which matures, no doubt in a favouring soil, the growth of criminal tendencies not previously developed—what Lombroso calls "criminaloids." Again, let us not forget, as Ferri points out, that "every man, however pure and honest he may be, is conscious now and then of a transitory notion of some dishonest or criminal action. But with the honest man, exactly because he is physically and morally normal, the notion of crime, which simultaneously summons up the idea of its grievous consequences, glances off the surface of the normal conscience, and is a mere flash without the thunder. With the man who is less normal, and has less forethought, the notion dwells, resists the weak repulsion of a not too vigorous moral sense, and finally prevails." These cases, as it were, are only waiting for the suitable environment, to break out; or for the suitable suggestion, which may either bring out the natural tendencies or free them for the time from the acquired moralities, and restore them to the impulses of the natural self.

For, after all, it must not be forgotten that a crime, as we understand it, is an offence against society. When we say that a man is born a criminal, we can only mean that he is born with certain anti-social tendencies, that he preserves in himself the natural instinct of the animal man, who recognises that the natural law is the struggle for existence and the survival of the fittest. The aggregation of men into societies has to a great extent modified the working of the law, but the mere fact that a man compromises his natural tendencies, for the sake of a state of mutual self-help, does not mean that he can absolutely get rid of the tendencies of his natural self. All the tendencies of social life are anti-criminal, altruistic not egoistic, and this environment modifies and often completely deadens the animal instincts; but it can be easily seen that the continued suggestions of egoism which the individual encounters in his daily life must bring out these animal instincts, and bring him under the category of the social criminal.

And in cases where self-defence is involved, when the very existence of the ego is at stake, the criminal instincts are easiest aroused. The normal man requires very little suggestion in his natural state to arouse for the moment, perhaps, these criminal feelings, when his general safety is involved; and hypnotism working along these natural lines is only more powerful by modifying or controlling to a great extent the selecting, projecting, and inhibiting power of the patient. In more than a dozen cases I have found that, after repeated hypnoses—in one or two cases on the second hypnosis—the suggestion that a particular crime should be committed, as a means of self-defence, has proved perfectly successful; and in these cases the condition of the hypnotic patients, instead of being one of languor and easy acquiescence, as are sometimes evinced in the cases of the type mentioned by Dr. Bramwell, is one of remarkable excitement—the patients showing a curious condition of fear, hatred, doubt, or determination. Here is a typical example. I hypnotise H. P.,[1] æt. 46, and merely suggest to him some of the favourite experimental conditions of the hypnotic state. Next day I hypnotise him again, and suggest to him that a certain F. N. has taken a strong dislike to him, and warn him of his movements. The patient is slightly annoyed, but seems to doubt the suggestion. On awakening from the hypnotic state, he questions me about the person F. N. (who, by the way, he knows slightly only), but I avoid any detail, and take good care that in the meantime H. P. does not meet F. N. Next day, at the third hypnosis, I tell him a story of how F. N. has a scheme wherewith he intends to poison H. P., that I had learned this scheme but had not sufficient evidence to convict him, that F. N. was the kind of man who could afford to wait till an opportune time to get rid of H. P. Having placed F. N. in one room, and having arranged in a side-room some bottles, one of which I labelled "prussic acid," but which contained a harmless fluid, I informed H. P., who was now deep in the hypnotic state, that F. N. had come to see me, was in the next room, and I wished him to go into the side-room, take down a bottle which stood next to the one marked "prussic acid," and pour him out a teaspoonful and give it to him in water. At the same time I suggested that he might find a means of protecting himself against F. N. H. P. immediately went into the side-room, and was about to take down the one bottle suggested, when his eye caught sight of the one marked "prussic acid." He immediately took this down, poured out a teaspoonful, mixed it with water, and took it to F. N., who drank it.

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[1] Paris, 1893.

Now, it is necessary to examine this case carefully, to discover any fallacies that may upset my contention. In the first place, was H. P. aware all the while that I was merely making an experiment, and was the final *coup* made with an awareness on his part that the bottle marked "prussic acid" was placed there on purpose, and was a bogus mixture? The main objection in answer to this possibility is this: Even if the patient did *suspect* that the bottle of prussic acid was a bogus one, it is not likely that he would allow himself to risk a crime on a suspicion and on a possibility of error, unless his tendency at the moment was in the direction of crime. No doubt there might have been considerable consideration in his mind, that the crime in this case would not be found out, and would be considered as an accident, but that does not get over the factor of the criminal tendency and criminal purpose being there at the moment.

I have notes carefully prepared of my other experimental cases, running on these lines. Two of these cases were patients with marked anti-social feelings, and in each of these cases the suggestions of crime were much simpler and much more easily carried out than the more complex one which I have thought it best to quote.

The difficulty of drawing the line between what I may call simple non-hypnotic suggestion and the suggestions of hypnotism ought not, it seems to me, to be a stumbling-block in the way of an attempt to modify the law in reference to hypnotism. No one will deny that, in the hands of unscrupulous persons, it may produce a vast amount of physical and social evil. And it is true enough that until it is moved by law out of the hands of the layman, it will never receive the distinguished recognition which has been accorded by men of science and philosophers to other sciences.

CLINICAL RECORDS.

ALARMING SYMPTOMS FOLLOWING THE INTRA-UTERINE INJECTION OF GLYCERIN.

By A. VEITCH, M.B.

IN his review of current literature, in vol. ii. p. 406 of this Journal, Dr. Haultain quotes from the *American Journal of Obstetrics* a case illustrative of the danger attending the intra-uterine injection of glycerin, for the purpose of inducing labour. The following case, in which most alarming symptoms followed the injection of 3 oz. of pure glycerin, supports the conclusion of the author quoted, that the method is far from being a safe procedure.

Mrs. B., æt. 38, in the second month of her seventh pregnancy, began to suffer from uterine hæmorrhage. She consulted me towards the close of the third month. The bleeding, which was slight, occurred daily, and pains were occasionally felt. Her previous pregnancy had terminated in an abortion at the third month. During the fourth month the uterus grew steadily, but the hæmorrhage continued with increased severity, notwithstanding rest and opium. In the early part of the fifth month, the patient, whose circumstances did not permit of further rest, became depressed, and I decided to empty the uterus. The sound was passed on two occasions, but failed to rupture the membranes or excite uterine action. A bougie introduced, and allowed to remain within the uterus eight hours, likewise failed. Three oz. pure glycerin were then injected through a No. 12 Chiene's metal catheter, introduced as far as the fundus. On the withdrawal of the catheter, glycerin flowed freely from the vulva, indicating free drainage. A few minutes later, the patient, in response to inquiry, stated that she had no pain, but a queer sickening sensation in the abdomen. I left, promising to return within an hour. On my return I found the patient in an intense rigor, and was informed that the rigor had lasted forty minutes, having come on just after I had left. The face was cyanosed, and wore a frightened expression. The teeth chattered. The surface of the body was cold; the pulse rate 45. There was no pain. One-third of a grain of morphia, an ounce of brandy, and a wineglass of hot water, were at once administered, and heat applied externally. Ten minutes later the patient vomited, and I had the pleasure of seeing the cyanosis pass off and the face clear. The brandy and morphia were repeated, and the rigor soon ceased. I then left. One hour later I found the patient resting quietly, free from pain, and the os dilated to the size of a florin. A little later strong pains set in, and soon afterwards a five months' ovum was expelled entire. The placenta exhibited signs of old and recent hæmorrhage. Recovery was uninterrupted, and at no time was there any suspicion of septic mischief.

The symptoms were no doubt due to shock, caused by the irritating action of glycerin on the endometrium. That over-distension of the uterus played no part in its production, is evident, for the method of injection permitted no accumulation within the uterine cavity.

REVIEWS OF
BRITISH AND FOREIGN LITERATURE.

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The Surgical Diseases of Children. By Edmund Owen, M.B., F.R.C.S. Third Edition. London: Cassell & Co. 1897.

It is stated in the preface to this revised and enlarged edition of Mr. Owen's well-known work, that he had an allotted number of pages. In Mr. Owen's case this is a matter of regret, since his writings are always worth reading, and, on many points, we should like a fuller statement of his experience and opinions.

As a matter of general criticism, it would, we think, have been wise if the author had omitted the necessarily condensed accounts of certain diseases which fall more especially within the physician's domain, such as pseudo-hypertrophic paralysis, tetany, and some others, and had devoted the space thus set free to a fuller exposition of some more purely surgical matters. Further gain of space might well have been got by omission of some of the descriptions of operations. We can get accounts of operations in detail from the special works on operative surgery, but we cannot get the benefit of Mr. Owen's experience and good sense, except from his own writings.

Perhaps the most prominent as well as the most valuable feature in the book is the sound practical wisdom of the directions and descriptions it contains. Mr. Owen is never extravagant and never rash; his words are much to the point, and his descriptions often very graphic.

There are, of course, sundry matters in the book on which there would be differences of opinion among surgeons; there are many we should like to discuss with the author, and some few in which we think his views as put forward here are incorrect, while there is no doubt that some of the figures are not worthy of the book. But there is no lack of excellent stuff here; the account, for instance, of tuberculous glands in Chapter VII. is most helpful.

We are glad to find Mr. Owen saying, "Craniectomy as an operation for the improvement of microcephalic idiots is dead." His remarks upon the unwisdom of delay in removal of diseased teeth ought to be framed and hung in every dentist's room. The account of the author's own method of operating for hare lip, a method we often employ, is of much interest; the drawback we have found in it is the tendency of the flap to twist somewhat, so that, though there is no notch, the skin line is not perfect.

The chapter on spinal caries is practical and useful, though we are surprised at the author giving even a qualified approval to aspiration of spinal abscess.

Mr. Owen's condemnation of the practice of forcibly straightening carious spines will, we hope, have solid weight in checking what we should call a surgical crime.

We do not like Mr. Owen's method of circumcision, by which the mucous membrane is left. We quite agree with him in the statement that the operation is often badly done; we think it would be true to say it is very rarely done properly, *i.e.* so done that it would be hardly possible to say that any operation had been performed at all, which is the ideal to aim at.

Mr. Owen is an opponent of suprapubic lithotomy, and would still do the lateral operation in cases unsuitable for lithotomy, unless the stone is very large. We think he is hardly as judicial in his estimate of the operations as usual.

Scattered through the book will be found excellent little aphorisms —for example, in the chapter on hernia, "The question of operating must be decided by the unmanageableness of the hernia rather than by the age of the child."

We, like Mr. Owen, have an allotted space, or many other points in this most useful and sensible book might be discussed.

Our chief complaint is, that we want more of the author's knowledge and experience, for we think he is a wise and safe guide, and we hope that in the next edition the publishers will be more generous in space, and Mr. Owen will give us more out of his stores.

G. A. WRIGHT.

Twentieth Century Practice—an International Encyclopædia of Modern Medical Science. By leading authorities of Europe and America. Edited by THOMAS L. STEDMAN, M.D., New York City. Vol. VII. —"Diseases of the Respiratory Organs and Blood, and Functional Sexual Disorders." London: Sampson Low, Marston & Co. Ltd., 1896.

THE multiplication of medical encyclopædias is the characteristic feature of present day literature, doubtless evoked by the same spirit of restless activity that fills the libraries with journals and year-books. In spite of its obvious misnomer, the work, of which the seventh volume appeared at the end of last year, is undoubtedly of a high order of excellence. Whether in all respects it will rank as high as the famous cyclopædia of von Ziemssen, which it is intended to replace, may be open to question, but, at any rate, few who consult its pages will go away unrewarded. Most of the articles in this volume are thoroughly representative of the most recent teachings of science, but, as may well be imagined, there is some diversity in the extent to which the writers respectively deal with their subject-matter. The volume is a varied one; indeed, there has been, in more than one of the previous volumes, a similar disregard for systematic arrangement of subjects, which, although a minor point, is yet a blemish on the work. The main subjects in this volume are certain diseases of the chest, and diseases of the blood. Articles on disorders of menstruation, functional derangements of the male sexual organs, and one on the urine, serve to make up a somewhat incongruous collection. We can only notice a few of these writings, and that in somewhat cursory fashion, for it can hardly be expected of any single reader to pretend to a tithe of the knowledge that is contained within the covers of this book.

Dr. W. B. Whitney gives a most careful and systematised study of pleurisy in the opening article; and no doubt most interest will be taken in that section of it which deals with sero-fibrinous pleurisy. The physical signs of this condition have now been so thoroughly worked out, that little remains to be said; but perhaps when the twentieth century arrives the means of diagnosis will be perfected by the application of the Röntgen rays to the detection of fluid collections within the chest. As it is, most physicians must confess to having been baffled occasionally, or perhaps misled by signs which the crucial test of exploratory puncture has not confirmed. In this affection, as in most diseases, it would seem as if attention is being more centred on questions of etiology than on those of semieology and morbid anatomy, and one is glad to notice that Dr. Whitney enters so fully into this branch of the subject, although, perhaps, he may be too much disposed to adopt the results of M. Netter's bacteriological investigations. One highly important question, which is yet but partially decided, is that of the share taken by tuberculosis in the production of pleurisy with effusion. It is often difficult to determine whether the case has this origin; for the detection of bacilli in the fluid is rare, and the subsequent development of pulmonary tuberculosis does not of necessity imply that the pleurisy was excited by that organism. It would seem, however, that at least 50 per cent. of the cases of pleural effusion are tuberculous; and that some of these entirely recover after paracentesis is no more surprising than is the analogous effect of paracentesis abdominis in tuberculous peritonitis. Amongst other lesser etiological factors are pneumonia, rheumatism, syphilis, cardiac and renal diseases, and "auto-infections," whereby the old explanation of chill is driven almost out of the field. Dr. Whitney's rules of treatment are sound and sensible, and, in contrast to the early days of paracentesis, his advice to withdraw but small amounts of fluid, stopping short of complete evacuation, is, we doubt not, that generally adopted. In the treatment of empyema, the advantages of rib-resection and of drainage without irrigation are emphasised. Dr. Whitney also writes upon pneumothorax, which in nine cases out of ten depends on softening pulmonary tubercle; the varied causation of the remaining tenth part of these cases is well illustrated.

Dr. F. Riegel of Giessen, who wrote on the same subject in von Ziemssen's "Cyclopædia," contributes the article upon asthma. He discusses the various views that have been put forward to explain the phenomena of this affection, and for his own part adheres to that which in this country is mainly held, namely, the doctrine of bronchial spasm, mostly excited by reflex irritation. At the same time, he admits the probability of the bronchial stenosis being increased by swelling of the mucosa, which some have made a primary factor. That there is such swelling, or even an exudative bronchiolitis, the character of the expectoration suggests, especially the presence therein of Curschmann's spirals and Charcot-Leyden crystals. The precise relationship of asthma to nasal disease has not been elucidated; but the notion that cauterisation of the nasal membrane, or even more severe rhinological treatment, is curative of the bronchial spasm has not gained in favour with the lapse of time. Indeed, although we have not had an opportunity to contrast the two articles, we doubt if Dr. Riegel has found much more reliable methods of treatment of a very distressing complaint than those with which he was acquainted when he wrote his previous article on the subject. Hay fever naturally falls into line with asthma. It is lucidly described by Dr. Fletcher Ingalls, who, in addition to prophylactic measures of removal from pollen-laden atmosphere and the administration of nervine tonics, advocates local treatment of the hypersensitive mucous membrane of the nose by sprays and insufflatives, or even by cauterisation.

Noting that the articles on diseases of the mediastinum and on diseases of the diaphragm are contributed by Dr. Main of Paris, the former subject with, perhaps, somewhat less fulness than it merits, and the latter, except in the important matter of paralysis of the diaphragm, treated in rather the reverse fashion, we must point to the next articles in the volume as being, perhaps, the best in the work. These deal with the blood and its various diseases with a fulness of knowledge and appreciation of all the work that has been done in this department of recent years, that must constitute these articles as marking the level of present knowledge on the subject. Dr. A. Stengel, of Philadephia, is the writer, and we cannot but regret the omission of bibliographical references, especially as his pages teem with the names of authorities. He adopts the view of pernicious anæmia being due to increased hæmolysis, and chlorosis to imperfect hæmolgenesis, but it would not be possible to do adequate justice to his work in a brief notice like the present. Nor can we enter into the numerous other contributions that make up the volume—the article on rachitis by Dr. Jules Comby, of Paris; on disorders of menstruation by Drs. E. W. Cushing and C. G. Cumston, of Boston; on functional disorders of the male sexual organs by Dr. C. W. Allen, of New York; and that on the chemical and microscopical examination of the urine by Dr. J. M. French, of Cincinnati. The volume, in a word, will be found not the least valuable instalment of an ambitious undertaking. SIDNEY COUPLAND.

Lehrbuch der physiologischen Chemie, mit Berücksichtigung der pathologischen Verhältnisse. Für Studirende und Aerzte. Von RICHARD NEUMEISTER. Jena: Gustav Fischer. 1897.

THE first edition of this book appeared in 1893, and as it is not without powerful rivals in the same field, the author deserves congratulation on the speed with which it has passed into a second edition. The rapid success of the book is still more surprising when the fact is taken into account, that it is written with an amount of detail which must appeal more powerfully to the smaller circle of research workers than to the larger one of students and medical practitioners, for whom the book is, according to its title, intended. It is essentially a book of reference, and not a text-book for students or practitioners.

The two separate parts of the first edition have in this issue been united under one cover to form a bulky volume of over 900 pages. The text has, however, been little altered, except by the interposition of brief accounts of more recent work, so that virtually the two portions of the work are as distinct as in the original edition.

The first part, which occupies a space of 400 pages, treats of nutrition, and includes the chemistry of the food-stuffs, digestion, absorption, and metabolism. The chemistry of the food-stuffs is clearly and fully written, and is copiously furnished with references to the original papers.

This is followed by a description of ferments and ferment action, in which both enzymes and organised ferments are considered. Although this section contains much valuable matter, space might be saved by a more systematic treatment.

The section on digestion occupies a space of 160 pages, and deals with some portions of this extensive subject at great detail; unfortunately, at the expense of others which are passed over very hurriedly. Twenty pages are spent upon a general view of the subject, on the occurrence of enzymes in various tissues, and on the fragmentary information we possess concerning plant enzymes and invertebrate digestion. The remainder is mainly a description of mammalian digestion, in which the digestive juices are first considered, and afterwards their action on each of the different classes of food-stuffs.

The various digestive enzymes are described in this section amongst the other chemical constituents of each digestive secretion; it is questionable whether more clearness would not have been attained by describing them together in the section on enzymic action. Again, the author seems to hold the opinion that the various amylolytic enzymes of the alimentary canal are identical, and endorses this opinion by describing them all as *ptyalin*. This is certainly a very dangerous procedure, for while there is no evidence that the various amylolytic enzymes are different, there is equally no evidence that they are identical, and it may in the future be discovered that they are distinct chemical individuals. In the meantime we know that they occur in the secretions of different glands, and it is surely better to retain the names that have been given to them, or to refer to them as the amylolytic ferment of the secretion, rather than to transfer to them all the name which has hitherto been applied to one member of the group.

The bile is considered by the author to be essentially an excretion of certain end-products of metabolism. Certainly the bile pigments are excretory, but these form only a slender part of the total solids of bile, and there is no doubt that in the past the digestive function of bile has been much underrated. The circulation of the bile salts and the dissolving action of the bile on fatty acids are probably quite as important functions as is the excretion of bile pigments. The argument that animals can survive without the digestive action of bile is of no great weight against the view that bile is an important digestive agent. Animals can also live without saliva, or without gastric juice, or without pancreatic juice, all of which fluids have been supposed to take more share in digestion than bile. The chemistry of bile is given very fully and clearly. In the section on the digestion of proteids, the author is dealing with a branch of his subject which has been much enriched by his own researches.

As one might naturally expect, the subject is treated in a masterly fashion. It is also delightful to observe to what a large extent the author has escaped from the theoretical trammels of the particular school to which he belongs. For, admitting that a great share of our experimental knowledge of proteid digestion is due to the labour of the Heidelberg school, there is no doubt that unfortunately a great deal of theoretical matter has been introduced by these workers which has never been verified experimentally; and, more unfortunately still, the terminology of the subject has become indelibly stamped with terms derived from these theoretical abstractions. It is therefore pleasing to find such an able pupil of Kühne stating independently the important experimental facts, many of which are due to his own distinguished labours, and only adding the "cleavage" hypothesis in a tentative fashion afterwards.

Physiological chemists will be thankful for the statement coming from such an authoritative source, that the expression "Hemipeptone" has only a theoretical meaning, and that "Hemialbumose" represents older ideas, and ought to be allowed gradually to disappear from the text-books; many would have been still more grateful if the author had abandoned the purely theoretical "cleavage theory" altogether.

Equal praise cannot be given to the author's treatment of the digestion of fats. The subject is presented in a number of scraps of a page here and a page there, due to the impossible attempt to treat fat digestion and fat absorption separately. Nor can the subject be said to be fully treated; not a word, for example, is said about the classical work of Marcet, and there is little excuse for such omission as there is a good account of Marcet's work given in Hermann's "Handbuch," which one would have supposed might be used as a fundamental source of reference by any author writing a work of this class. The information concerning more recent work is also very scanty. The old view is expressed, that only a small fraction of the fat is decomposed in the intestine, and that by far the greater part is absorbed without decomposition; this is quite contrary to much recent experimental work. A considerable amount of theorising is also given which is based on the erroneous supposition that the intestinal contents possess an acid reaction.

The second part of the book treats of the animal tissues and fluids, under the headings of muscle, connective tissue, nervous system, the skin with its appendages and secretions, glands, organs of development, blood and lymph, milk, and urine.

The chemistry of these various tissues is described at great length, and the description is accompanied by numerous references to the original articles. The subjects are on the whole fairly well brought up to date, but one finds in some places curious omissions concerning matters which are at present exciting considerable attention among physiological chemists. For example, the chemistry of the suprarenals occupies a space of less than a page; no reference whatever is made to the work done on the subject in this country during the last three years, and in other ways the account given is antiquated.

On the whole, the chief merit of the book lies in the painstaking detail with which in general the various subjects have been described;

this is greatly enhanced by the abundant references which will be found most useful by research workers in nearly every branch of physiological chemistry. Excellent as these references are, they are, however, made to take up a great deal too much space, by citing in each case the title of the paper quoted. Occasionally the title of a paper does give one an idea of the nature of its contents. But in a text-book this ought to be sufficiently done by the text, and often the reference is not to the main subject of the paper but to some side-issue raised therein. Any person seeking a reference is guided sufficiently as to the subject-matter by reading the text of his book of reference; and if he wishes to consult the original paper he can be sufficiently directed to that by a reference to the journal, year, and page. Another fault in the references is the universal translation of the titles into German. As has been pointed out above, titles are unnecessary, but if they are given they surely ought to be given in the original language in which they were written. Any person about to look up a reference must be able to read the language in which the paper is written, if he can do this he can also read its title in that language. It is surprising that the author has not translated the names of all the journals into German also, for this would be no less absurd. B. MOORE.

Gray's Anatomy, Descriptive and Surgical. Fourteenth Edition. Edited by T. PICKERING PICK. London: Longmans, Green & Co. 1897.

THE quickly recurring editions of this well-known text-book of human anatomy afford satisfactory evidence of the position which it occupies in the estimation of the student of medicine. The present handsome volume compares favourably with its predecessors, although the tendency to a steady increase in the number of its pages is not one which the student will view with rapturous satisfaction. The inclusion of new matter is certainly to be commended, indeed it is absolutely necessary, for human anatomy is by no means the exhausted subject that some would have us believe; but when descriptions are drawn out to infinitesimal details, the work tends to become a book of reference rather than a student's manual, which has been the position hitherto occupied by "Gray's Anatomy."

In its general mode of arrangement, the book adheres to the plan of its earlier editions. The sections on general anatomy and the development of the body are not unduly prolonged. The skeleton is characterised by lucid and extremely elaborate descriptions of the individual bones, accompanied by numerous illustrations which are faithful and easily interpreted. At the same time, one regrets that the editor has considered it necessary to conclude the description of each bone by giving a list of the names of the muscles attached to it, especially as each of these muscles has already been mentioned in the course of the description of the bone, besides having its attachment emphasised by coloured lines on the figures. A student is apt to acquire the idea that these lists of names must be committed to memory, whereas such information can scarcely rank as anatomical knowledge.

The articulations are classified according to the best and most practical method, namely, the presence or absence of movement, but the illustrations of the ligaments tend to be somewhat too diagrammatic, and, as a consequence, the student is disappointed when he finds that his own dissections do not readily produce the details given in the figures. The muscles are described at great length, and the attention of students is wisely drawn to the fact that, as regards nerve supply, individual muscles in the upper and lower extremities may be, to a large extent, correlated with particular spinal nerves as well as with the nerve trunks which distribute their nerves of supply. In certain cases the names of muscles have been changed, but it is doubtful how far this is advisable, especially when a thoroughly *descriptive* name is thereby sacrificed. The vascular systems present probably the daintiest sections in the book. The treatment of the brain is on the usual lines, as are also the remaining systems of the body. A special feature is made of the peritoneum, which is described from its developmental aspect by Dr. Brockway of New York. The volume extends to 1146 pages, of which nearly six hundred are devoted to the skeleton, joints, muscles, and vessels, a proportion which is really in excess of their importance, and might well be reduced by the exclusion of details pertaining more particularly to the dissecting-room. The pelvic fascia is rather summarily disposed of in half a page. Questions of surface anatomy might have received fuller illustration. Taken as a whole, the book maintains a high standard of excellence; its information is reliable and easily accessible; and it is provided with a copious, well-arranged index.

David Hepburn.

Atlas and Essentials of Gynæcology. By Dr. Oscar Schaffer. London: Baillière, Tindall & Cox. 1897.

This volume forms vol. iv. of the "Hand Atlas Series." It is of convenient size, and the coloured plates, from the establishment of Reichold of Munich, are admirably executed. Some of the plates represent pathological conditions on a reduced scale of drawing; a few, chiefly views of the cervix, as seen through the speculum, are of full size. Some of the plates contain drawings of microscopic sections; the remainder, to the number of eighteen, contain schematic diagrams of various conditions, such as uterine displacement; and of various procedures, such as the bimanual examination and the passage of the sound. Plate 63, for example, has two diagrams showing the positions of the hands in applying (Thure Brandt) massage for the reduction of retroversion with adhesions. Besides the explanations of the plates, the volume contains about 230 pages of letterpress, with sketchy diagrams, giving the "essentials of gynæcology." In this section the author attempts to cover the whole ground, including descriptions of the operations; but these are of little value to the student, beyond recording in a brief manner the chief points of the various methods. In describing ovariotomy, for example, the author says: "The operation itself should not be performed by anyone who has not repeatedly watched it as assistant or has carried it out under supervision. For this reason I will merely mention a few important facts." After this we find, under treatment of cervical cancer: "If we have to deal with ulcer of the cervix, it seems to me that the only safe plan is total extirpation of the uterus," followed by a brief description of the operations. In this part of the work some of the woodcuts are too dark to be easily understood. Procedures and instruments are frequently referred to by the name of their introducers, without description; readers unacquainted with German will probably not understand treatment by "Priessnitz's compresses," "Sool baths," and "Zwieback." The work has no index.

E. H. L. OLIPHANT.

Manual of Gynecology. By D. BERRY HART and A. H. FREELAND BARBOUR. Fifth Edition. Edinburgh and London: W. & A. K. Johnston. 1897.

SINCE its first publication in 1882, various editions of this work have enabled the authors to keep the Manual up to date; and they now take the opportunity of, in great part, rewriting the chapters on operative gynæcology, and of providing new illustrations. This edition retains the essential features of the first, and must maintain its reputation as a first-class book of reference for the operative gynæcologist, as well as for the ordinary student. The authors give details of the best modern procedures, and yet assume a cautious attitude in laying down indications for, and in forecasting the results of, operations. The antitoxine treatment of pelvic inflammations is discussed, and emphasis is laid on tubal disease in their causation. In the first edition, the remarks on antiseptics were confined to a short discussion on the value or hurtfulness of the Listerian carbolic spray in operations involving the peritoneal cavity; the present volume contains a chapter on the modern view of wound infection, and on the various methods of disinfecting and sterilising the person and apparatus. In the treatment of pelvic hæmatocele the expectant treatment is recommended during the occurrence of hæmorrhage ("the present state of knowledge does not enable us to lay down any rule as to the opening of the abdominal cavity"), though immediate operation in cases of ruptured tubal gestation is, in somewhat guarded terms, admitted to be justifiable. Among the possible indications for oöphorectomy in the future is mentioned inoperable mammary cancer, as recommended by Beatson of Glasgow.

Abdominal section is described in detail in connection with ovariotomy, as also in an appendix. The method of closing the abdominal wound is not very clearly described, as no reason is made to appear for threading the needle in the wound instead of sewing a continuous suture in the ordinary way; it seems an unnecessary waste of time. Under the heading of carcinoma uteri we have descriptions of vaginal hysterectomy by ligature and clamp respectively. The authors recommend the technique of Doyen, who splits the uterus along its anterior surface, or removes a large V-shaped segment from its anterior surface, to facilitate the pulling of it down when bulky. They make no mention of what we consider the increased risk of inclusion of the ureters by the clamp as against the ligature. Oddly enough, the ureters are not mentioned in this connection at all. In regard to prognosis, the authors are very guarded on the question of recurrence and metastasis, and quote Kelly, who attempted, by abdominal section, to cut more widely than is possible by vaginal hysterectomy. He passed bougies into the ureters, to enable him to divide the tissues as far as possible from the original seat of the cancer, without risk of wounding those organs; yet he found that out of twenty such operations, in only four did microscopic examination show the cut surface to be healthy. Deciduoma malignum is discussed at length, with a tabular record of fifty-five cases. The authors do not commit themselves to admit proof that this is really of decidual origin and not rather a sarcoma modified in its course by pregnancy. They draw attention to its rapid development, and to the frequent occurrence of metastases which are usually pulmonary, and to the necessity for early and complete extirpation before these have occurred, as curetting is useless. Illustrations of the naked-eye and microscopic appearances are given. A coloured drawing of ulcus serpiginosus is given, and also a microscopic section of the same condition. Local massage for uterine displacement is virtually condemned, as also Schultze's method of separating adhesions under chloroform. Readers are referred for further details on electric treatment to Allbutt and Playfair's "System of Gynæcology." The various indications for "Apostoli's" method are given: "The results of electrical treatment are such that it has now a recognised place in gynecology. Perhaps the most striking results are seen in the absorption of inflammatory deposits." E. H. L. OLIPHANT.

The Sanitary Inspector's Handbook. By ALBERT TAYLOR. Second Edition. London: H. K. Lewis. 1897.

IN the preface to this book we learn that it aims at "supplying practical information on the various matters which come daily under the notice of the sanitary inspector." Assuredly such a book is needed. The important work now entrusted to this official, and the great service to public health which a conscientious and intelligent discharge of his duties renders, as well as the increased remuneration of his services, have all concurred in creating a demand for some guarantee of his fitness for such duties.

Written by a sanitary inspector, this handbook gives a clear and concise account of the duties that fall to that office, as well as valuable hints and advice in the discharge of them, doubtless the outcome of the author's own experience. The *inspecting* part of the duties and the clerical work are very fully treated. One must, however, not forget that there are other duties certainly not less important, and here the book is sometimes defective, not to say misleading. For example, we are told the presence of sewer gas in a room may be detected by exposing moist acetate of lead paper, and "if sewer gas is present in any considerable quantity the paper will be *completely blackened.*" This statement is distinctly misleading. The air in sewers contains as a rule little sulphuretted hydrogen; indeed, Dr. Millar, in examining the air of the London sewers, found sometimes traces and sometimes none. There might be a large quantity of sewer gas escaping into a room and yet such paper be totally unaffected.

Again, the routine work of disinfection, one of the most important duties of the sanitary inspector, is described too loosely and generally. We find no precautions described for preventing the spread of infection through a house, in course of removing the bedding, etc., to the disinfector. In disinfecting with chlorine gas we are told that a "few drops of strong hydrochloric or dilute sulphuric acid is to be added to the bleaching powder." This looseness in many points of practical detail is a distinct misfortune in a book which seems otherwise so well suited for its purpose.

C. HUNTER STEWART.

Hygiene and Public Health. By LOUIS C. PARKES, M.D. Fifth Edition. London: H. K. Lewis. 1897.

THE call for a fifth edition of this manual of hygiene, and this notwithstanding the large number of other works on the same subject before the public, is *primâ facie* evidence that the book before us has made for itself a distinct place in current public health literature. It contains much valuable information, excellently arranged and conveyed in a clear style. To us, however, it appears that in a book of this size there is a distinct advantage in leaving out such subjects as cannot be fully discussed, and using the space so gained for the elaboration of other and possibly, in the circumstances, more important subjects. For example, we question if in many cases a satisfactory analysis could be conducted from the instructions given, and think that the space taken up by a sketchy account of laboratory methods might have been used to greater advantage in extending the chapters on epidemiology, or in giving a better account of school hygiene. In the method given for estimating the amount of carbonic acid in the atmosphere, we are told to take a glass-stoppered vessel of 2 litres capacity, which is to be "filled with mercury and emptied in the place the air of which is to be examined." Surely water is meant here, as this bulk of mercury weighs over 60 lbs. We note the same statement in a former edition.

The chapters on epidemiology are well and clearly written, and the author takes care in discussing opposing views to give a fair statement of each. Indeed, the book in the main gives excellent and serviceable information on the subjects dealt with.

C. HUNTER STEWART.

RECENT ADVANCES IN MEDICAL SCIENCE.

MEDICINE.

UNDER THE CHARGE OF

A. LOCKHART GILLESPIE, M.D., F.R.C.P.Ed.,

MEDICAL REGISTRAR, EDINBURGH ROYAL INFIRMARY.

Exophthalmic Goitre.

Paul Riche (Thèse de Paris, 1897, *Gaz. hebd. de méd.*, Paris, 1897, No. 35) strives to show that exophthalmic goitre is only a peculiar form of the ordinary goitrous enlargement of the thyroid gland. It may be produced by excitation of the cervical sympathetic. Vigouroux, describing the technique of faradisation for this disease, warns the operator against placing either of the electrodes on a point 1 cm. behind and below the eyebrow, otherwise the eye symptoms will be increased. Jaboulay has observed that section of the sympathetic in the neck is followed by the disappearance of the symptoms of exophthalmic goitre. Following out this line of thought, Riche assigns the primary cause of the special symptoms to the dilatation of the inferior thyroid artery, arising from the increased demand for blood to the gland; this dilatation brings the walls of the vessel in contact with the sympathetic nerve, and by its pulsations causes irritation. The first sign consists in tachycardia, exophthalmos following later. Riche appears to have premised, for the purposes of his ingenious theory, that all cases of exophthalmic goitre exhibit a sufficient degree of enlargement of the inferior thyroid artery to irritate the sympathetic, although in some patients the pathognomonic symptoms precede, in others follow, the local turgescence.

Abadie (*Gaz. d. hôp.*, Paris, 8th July 1897) cites the three theories put forward by Eulenburg at the last Medical Congress in Germany, to explain the genesis of exophthalmic goitre, each of which appeared to him to be equally feasible. These theories are—(1) That the disease is due to changes in the blood; (2) that it is purely of nervous origin; and (3) that it arises directly from alterations in the thyroid gland. Abadie fears that as each of these theories is absolutely different from the others, and does not suggest any really useful form of treatment, or at least a form of treatment superior to those indicated by the others, the truth cannot lie in any. The third and most recent theory—the thyrogenic—has received much support, but although the most seductive, is the one which has led to the most disastrous therapeutic results. "Interference with the thyroid gland has been and still every day is followed by a fatal ending, and it is high time that it should be definitely abandoned."

Abadie proceeds to indicate the points which appear to him to throw most light on the nature of the disease, namely, the limitation of the area in which excessive arterial pulsation obtains to that supplied by the cervical sympathetic; the fact that if the disease were due to excessive production of thyroid secretion, all the other arteries in the body would likewise pulsate in this way; there is no relationship between the size of the goitre and the exophthalmos, showing that the thyroid gland is not directly concerned with the eye symptoms. He then advances the theory that the malady is due to a permanent excitation of the vaso-dilators of the cervical sympathetic. Operative treatment directed towards the gland is followed by disastrous results; section of the sympathetic trunks between the upper and middle ganglia has recently caused the subsidence or disappearance both of the goitre and the exophthalmos. When these nerves are divided, the vaso-dilatation of the retrobulbar vessels, which causes the exophthalmos, diminishes, and that of the thyroid arteries causing the goitre is almost abolished. In cases where the inferior thyroid artery arises from the subclavian, its rôle is insignificant. The greater influence exercised by the section of the sympathetic nerve below the superior ganglion upon the goitre, as compared with the exophthalmos and tachycardia, can be explained by the fact that all the fibres running to the superior thyroid artery, the most important factor in its causation (*pace* Riche), are supplied by the upper ganglia, and are contained in the nerves below them. The other symptoms are often ameliorated, but the fact that they do not disappear *pari passu* with the goitre proves that they are not dependent upon it, corroborating the evidence yielded by their persistence after thyroid ablation.

Should there be any doubt as to whether the goitre be of a simple character, or of the exophthalmic type, thyroid therapy serves as a "touchstone": the first is ameliorated, the symptoms of the second intensified.

Doyen (*Semaine méd.*, Paris, July 29, 1897), on the other hand, relates two cases in which ablation of the thyroid gland cured all the symptoms of exophthalmic goitre. When the patients were given thyroid extract, after the apparent cure, all the symptoms returned temporarily. Sufficient time has not elapsed to show whether Doyen's patients will escape myxœdema or not, but he regards the removal of the gland as easy and devoid of danger, section of the sympathetic as useless and dangerous.

Although perhaps appertaining more to surgery than medicine, the results of the recent developments in the operative treatment of exophthalmic goitre bear so closely upon its etiology, that some of the latest surgical reports on this subject may legitimately be noticed. Péan (*Bull. Acad. de méd.*, Paris, 1897, tome iii. p. 31) corroborates Doyen, pronouncing section of the sympathetic resultless and unnecessary, thyroidectomy as successful and safe, while the after occurrence of myxœdema need not be feared, as, out of a large number operated on, only two or three developed this disease (and, it may be added, the exhibition of thyroid extract will subdue any of its symptoms). Poncet, however, believes that both Doyen and Péan make too light of the dangers of thyroidectomy (*ibid.*, 1897, tome iii. p. 221). Statistics show a mortality of from 15 to 30 per cent. He recommends division of the sympathetic should the actual goitre be small, thyroidectomy only in urgent cases.

Several others (Vanderbinden and De Buck, *Belg. méd.*, tome iv. p. 33; Vignard and also Tuffier, *Gaz. hebd. de méd.*, Paris, March 11, 1897; Sänger, *Neurol. Centralbl.*, Leipzig, 1897, Bd. xvi. S. 8, and others) have recently recounted their experiences with regard to the operative treatment of the disease, but no conclusion can be drawn from their contradictory results and opinions.

Hector Mackenzie (*Am. Journ. Med. Sc.*, Phila., Feb. 1897) gives the particulars concerning fifteen cases of exophthalmic goitre, treated by other physicians with thymus extract, and of twenty cases similarly treated by himself. Of the first fifteen only one case showed no improvement; in three the exophthalmos disappeared, in five it was lessened, in four the goitres of large size were unaffected, in the others only slightly diminished, although in fourteen cases the general condition was much improved. Of the twenty cases under his own care, one died, no improvement occurred in six; while in thirteen some benefit was experienced. Contrasting a series of twenty cases, for which thymus extract was not used, with the twenty noted above, little difference could be detected, but many of the patients treated with thymus gland expressed themselves as being the better for it, and desired its continuance.

ALCOHOL.

STERN (*Med. News*, Phila., September 18, 1897) deals with the subject of alcoholic epilepsy, giving details of five cases which occurred in his own practice. The first patient exhibited more the symptoms of *petit mal* than of true epileptic convulsions. The second developed typical epileptic paroxysms, with prodromal headache and vertigo, an aura akin to the globus hystericus, and the true epileptic cry. Neither of these patients came from a neurotic stock, nor had they ever been ill. The third patient, a female, developed epileptic fits only two days after beginning to drink. After a fit, acetone and diacetic acid were found in the urine. She died in four months, in a state of status epilepticus and coma. Another patient, with a habit of going "on the spree" once a month, only had one fit, total abstinence after it preventing a recurrence. The last case, a female, ordered to take cognac for her health, took so much of the tonic that she was attacked by *petit mal* three months after her first indulgence. On stopping the alcohol the fits gradually ceased. None of these patients was under 37 years of age. The stoppage of alcohol was all which was necessary in the way of treatment. Cases in which the alcohol habit is ineradicable are practically hopeless. In the third case of the series, the presence of acetone and diacetic acid in the urine, in the total absence of glucose, is only explicable by the supposition that these bodies were derived from the alcohol taken. Crimes committed during an alcoholic epileptic fit or in a stage of post-epileptic unconsciousness, have been judged in America in one or two instances to be excusable on the grounds of *non compos mentis.*

Reinhold (referred to on S. 502 of the *Wien. med. Bl.*, No. 30, 1897) details the case of a man, æt. 41, who had taken 60 grms. of paraldehyde in the preceding twenty-four hours. When seen his speech was difficult and stuttering, his tongue and hands tremulous. In the course of recovery from a state of delirium tremens paraldehydicum, epileptic fits ensued, followed by ideas of persecution and hallucinations. The treatment recommended is large doses of alcohol and bromides, and, after cure of the poisonous symptoms, the exhibition of bromides and trional for the sleeplessness which originally induces the patient to take the paraldehyde.

Bechterew (*idem,* S. 504, from *Russ. psychiat. Ztschr.*) deals with the question of sensory hallucinations in alcoholics, and their probable origin; a question which has recently been the subject of controversy between Liepmann and Alzheimer. To produce hallucinations, Bechterew used the hammer of an induction coil, or a bright movable object. Hallucinations were easily induced, not only in those in delirium tremens, but in those convalescing from it, months even after the actual attack. Such hallucinations had no unpleasant or fearful import, like those arising spontaneously. The cause of these artificial hallucinations was to be found in the heightened irritability of the sense organs, and still more in the influence of a strained attention, acting on the psychical centres to almost a pathological extent. If the attention of the patient was not concentrated on the objects used, no such phenomena occurred. The diagnostic importance of artificially induced hallucinations in alcoholics loses much of its significance, owing to their presence in other psychoses.

SURGERY.

UNDER THE CHARGE OF

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Clinical and Experimental Studies on the Infective Diseases of the Urinary Passages.

Under the above title, Rovsing of Copenhagen contributes a series of articles to the *Ann. d. mal. d. org. génito-urin.*, Paris, from the months of September to December inclusive. Although largely controversial, they are of considerable interest and importance. We shall refrain from noticing the differences of opinion which exist between the author and the Necker school as represented by Professor Guyon. Rovsing divides his subject into the following heads:—(1) Bacteriuria; (2) pyelitis without cystitis; (3) pyelitis with cystitis; and (4) cystitis.

1. *Bacteriuria* is the name applied to the condition in which bacilli

are present in the urine while inflammatory products (pus, albumin) may be absent. The bacilli gain access to the urine from without by instrumentation, or from within through the circulation, especially in hæmaturia of renal origin. In most cases of so-called bacteriuria, pus corpuscles are found in the urine, which indicates that a focus of inflammation exists somewhere, although hidden and unattended with symptoms, and represents the source of the bacteria. The organisms usually present belong to the bacterium coli group; they infest the bladder, and, being endowed with movement, they may ascend and gain a lodgment in the pelvis of the kidney. In uncomplicated cases, the chief symptom is the bad smell of the urine. For these, the proper treatment consists in directing the patient to drink large quantities of water, so as to irrigate the urinary passages and to administer salol in such doses as will render the urine relatively antiseptic. Among the thirty-three cases observed by the author, there were some in which the colon bacillus appeared to have been present in the urine in enormous numbers for years without causing any alteration in the mucous membrane of the urinary passages.

2. *Pyelitis apart from cystitis.*—This group included 21 cases, in all of which the colon bacillus was present, usually to the exclusion of other organisms; in a few cases along with various cocci. The colon bacillus is regarded as the essential factor. The striking feature in these cases is that, in spite of the presence of the bacillus and of pus in the urine, the latter remains acid and the bladder remains normal, the latter fact being demonstrated by the cystoscope. The author's explanation is that the colon bacillus does not bring about decomposition of the urine; hence the mucous membrane of the bladder is not damaged by contact with an ammoniacal liquid, and is able to resist bacterial invasion. In opposition to Guyon, he also holds that the kidney substance is similarly resistant to infection by the colon bacillus; in spite of long-standing pyelitis, there were no clinical evidences of nephritis; operative wounds in the kidney, although soiled by pus from the pelvis containing the bacillus, healed by first intention. Even the pyelitis is described as benign and superficial in character. As regards the method in which the organisms reach the renal pelvis, this would appear to take place from the blood, assisted by the recent passage of gravel from the kidney, causing a solution of continuity and hæmorrhage. The bacilli gain entrance to the circulation from time to time through a lesion of the intestine, and find a favourable nidus for their development in the mucous membrane of the renal pelvis, especially where this is mechanically irritated by the presence of concretions. The urinary condition may be preceded by a lesion of the intestine, *e.g.* diarrhœa, catarrh, worms, dysentery, constipation. The possibility is also suggested that the bacilli may reach the pelvis of the kidney from the corresponding colon by a more direct, although as yet unknown, route. However they reach their seat of development, Rovsing maintains the frequent concomitance of renal lithiasis and pyelitis, in which the colon bacillus is the chief organism concerned.

In considering the symptoms of this pyelitis, it is to be borne in mind that in many cases it is complicated with renal lithiasis or calculus, to the mechanical influence of which many of the symptoms may be ascribed. Eliminating these as far as possible, it is remarkable that the patient may preserve the appearance of excellent health, in spite of the number of bacilli and the amount of pus in the urine. Should there occur, however, any obstruction to the outflow of urine by the impaction of a calculus, or pseudo-membranous masses, or by the pressure of a pregnant uterus, the urine stagnates in the pelvis of the kidney, and the toxins of the colon bacillus are absorbed; the patient then suffers from illness, shiverings, fever, etc. Should the obstruction be overcome, the general health is regained. The condition of the urine in "colonic" pyelitis is characteristic; it is diffusely turbid, with abundant bacilli and pus corpuscles; albumin is only present in proportion to the amount of pus. Epithelial cells and casts are absent, *i.e.* there are no evidences of nephritis. In cases complicated by calculus, there may be red blood corpuscles. Micturition may be frequent and painful, although the bladder may be proved to be quite normal by means of the cystoscope; otherwise one would certainly assume the existence of cystitis. The cystoscope is further useful in demonstrating which of the kidneys is the seat of the pyelitis.

In treating the condition, the first object is to determine whether there is a stone in the pelvis or not; on removal of the stone, the pyelitis may be expected to recover. Apart from calculus, any other condition must be got rid of which interferes with the outflow of urine, *e.g.* obstruction or kinking of the ureter, stricture of the urethra, etc. Having eliminated complications, the pelvis of the kidney should be irrigated by drinking large quantities of boiled or distilled water, and salol should be administered. Rovsing advises against the use of alkaline mineral waters and against milk, because it renders the urine alkaline and constipates the patient.

3. *Pyelitis with cystitis.*—This group includes fourteen cases, in which, as contrasted with Group 2, quite a number of different organisms are concerned, most of which have the power of decomposing the urine and rendering it ammoniacal; in a minority this phenomenon is absent, and the urine remains acid.

Considering, first, those cases in which the urine becomes ammoniacal, it is found that staphylococci are the chief organisms concerned, that the affection usually originates in renal lithiasis, that the cocci reach the pelvis of the kidney by way of the circulation, that the pyelitis and cystitis tend to be severe and acute, and that diffuse parenchymatous nephritis will supervene sooner or later. Eliminating the symptoms which may be ascribed to the presence of concretions or calculi, the patient who is the subject of ammoniacal pyelitis, emaciates rapidly, his skin becomes yellow and dry, he is out of health, is liable to rigors and attacks of vomiting. The accompanying cystitis, through causing frequent and painful micturition, interferes with rest and sleep. The pain and tenderness in the loin is more marked than in colonic pyelitis. The urine, when recently passed, is more or less alkaline; it is turbid, but clears on standing, and deposits a glairy, purulent sediment. Microscopically, it is found to contain numerous bacteria, epithelial cells, casts, pus corpuscles, occasionally red blood corpuscles, and crystals of triple phosphate and of urate of ammonia. The prognosis, apart from the presence of a calculus, is more serious in cases in which staphylococci and streptococci are concerned, and is uncertain because of the liability to nephritis.

In the diagnosis, it is important not to allow the bladder symptoms to draw away the attention from the pyelitis, and to rely upon the cystoscope for information as to which kidney is the one affected. Catheterisations of the ureters across the infected bladder is unnecessary and unsafe.

The treatment consists in irrigation from within, the administration of boracic acid, the treatment of the accompanying cystitis, and the removal of any complication, such as calculus; any cutting operation on the kidney is, however, attended with greater danger than in cases in which the chief part is played by the colon bacillus.

The smaller group of cases in which the urine remains acid, included two in which the primary lesion was a tuberculosis of the kidney, involving the pelvis and spreading down to the bladder; recovery took place in both after removal of the affected kidney. The third case followed upon typhoid fever; there was a calculus in the pelvis, and the typhoid bacillus was demonstrated in the pus and in the urine; as the patient succumbed, these facts were verified on post-mortem examination. The fourth chapter, on *cystitis*, will be made the subject of our abstract in the next number of the Journal.

SARCOMA OF THE KIDNEY IN CHILDREN.

DR. GEORGE WALKER, of the Johns Hopkins Hospital, reports three cases of this condition, and presents the following conclusions from a study of the extensive literature of the subject:—

Malignant tumours of the kidney in childhood occur either congenitally or within the first four years of life; most frequently between 1 and 2 years of age. All of them are probably embryonic in origin, as evidenced by the fact that they contain distinctly embryonic tissue.

They are very rapid in growth, and are not attended with any destructive systemic symptoms in the first half of their course; in the late period they are accompanied by rapid and great constitutional disturbance. The left kidney is more often affected than the right. There is no sexual variation. Without operation the average duration of life is 8·08 months; with operation it is 16·77 months.

Operative treatment, to be successful, should be instituted as early as possible. Operation is followed by an immediate mortality of 38·25 per cent.; an ultimate one somewhere between 74·32 and 94·53 per cent.; 5·47 per cent. of cures; and a lengthening of life by 8·08 months. —*Ann. Surg.*, N. Y., November 1897.

CHOLECYSTOTOMY *v.* CHOLECYSTECTOMY IN THE SURGERY OF THE GALL BLADDER.

AT a recent discussion on the surgical treatment of biliary lithiasis, at the Surgical Society of Paris, the relative claims of cholecystotomy and cholecystectomy were made the subject of criticism. Tuffier maintained that cholecystotomy was the operation of choice. Michaux, on the other hand, did not regard cholecystotomy as the simple procedure it was usually assumed to be; it was often difficult to extract the calculi and to prevent the contents of the gall bladder, when septic, from infecting the peritoneum, and the wall of the gall bladder when friable was easily torn. He had found it easier to excise the gall bladder, unless the adhesions were a prominent feature; the results of excision showed that the operation was only slightly more dangerous than cholecystotomy. The excision of the gall bladder was more radical, was more likely to be followed by permanent relief, and was not attended by the inconvenience and risks of a biliary fistula. Calculi impacted in the common duct were to be removed at the same time as the gall bladder was excised. Schwartz prefers cholecystotomy to the more radical operation, unless in robust individuals in whom the liver is healthy, the cystic and common ducts free from calculi, and the removal of the gall bladder does not present any great difficulties. Gérard-Marchant advocates excision of the gall bladder in suitable cases. Routier pointed out that statistics were misleading, because the more difficult and complicated cases were very properly subjected to the simpler cholecystotomy. Monod regarded the latter operation as less dangerous and as the one to be preferred. Reclus referred to the extrusion of stones, which had not been recognised at the operation through a biliary fistula, as an advantage of cholecystotomy. Regnier only performs cholecystectomy when the common duct is patent and there is no jaundice.—*Bull. et mém. Soc. de chir. de Paris*, tome xxii. p. 245; *Centralbl. f. Chir.*, Leipzig, No. 42, S. 97.

OBSTETRICS AND GYNÆCOLOGY.

UNDER THE CHARGE OF

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TREATMENT OF INCOMPLETE ABORTION.

SOME valuable practical hints in the treatment of this extremely common condition, may be gleaned from a series of ninety-nine cases treated in the Maternité Lareboisiere, and recorded by Maygrier.

The author considers that artificial removal of the contents of the uterus is indicated—(1) Where retention of the uterine contents is associated with hæmorrhage, fever, putrid discharge, or any other signs of septic infection; (2) in multiple pregnancies; (3) where artificial abortion has been attempted; (4) in cases of prolonged retention, where the cervix has been dilated and tends to close.

Removal of the uterine contents is to be performed either by the finger or curette; the former is strongly favoured as being less dangerous. During the use of the latter, on several occasions the soft uterine wall was penetrated. Should the curette be used, he strongly advocates that it be of large size, and the cervix sufficiently dilated to allow of the introduction of the finger as a guide. After thorough scraping of the uterine cavity, either by the unaided finger or by the curette, the uterine cavity should in all cases be swabbed out with a strong antiseptic, and the vagina packed with iodoform gauze.

In the ninety-nine cases recorded, fifty-five were treated by the finger alone, and forty-four by curettage; six deaths occurred—two the result of perforation of the uterus with peritonitis (this had been done before admission to the hospital); one the result of suppurative salpingitis; and the three remaining from septic infection, from which they suffered on entrance.

Interesting in connection with this paper is the discussion on the treatment of post-partum retention, held in the Société obstétricale et gynécologique de Paris. M. Nitot strongly advocated the use of the curette, and recommended the use of large fenestrated instruments of different sizes, varying from 1 in. to 1⅜ in. in diameter.

Budin considered curettage dangerous, and seldom had recourse to it, preferring the unaided use of the finger, and completing the operation by washing the uterine cavity with an antiseptic solution, and subsequently swabbing in all directions. Charpentier entirely differed from Budin, and strongly recommended curettage, never having had an accident. He advocated the use of a sharp-edged instrument, and advised scraping till the characteristic sound of the curette upon the uterine wall could be observed everywhere. Budin emphatically protested, and suggested that in diseased conditions of the uterus the wall might be perforated and peritonitis result.

Charpentier contended that when the uterine tissue was so altered by severe infection as to be soft and friable, curettage was useless and unnecessary to attempt. It was not thus he advocated its employment. It should be performed early, as soon as simple uterine irrigation was found inefficacious; it then would act exclusively on the uterine mucosa before infection of the muscular wall had occurred, and the muscle would offer resistance sufficient to allow of thorough scraping. The diseased mucosa would thus be completely removed. The uterine cavity should then be thoroughly swabbed with glycerin and creasote, 3 to 1. It was because curetting was performed too late, when the uterine wall had been infected, that the operation was so frequently unsuccessful. Performed early, curetting was superior to other methods. In experienced hands it was an absolutely safe procedure, hence its early adoption. The consensus of opinion among the other speakers was fairly equally divided.—*L'Obstetrique*, July 1897.

RECURRENT ECTOPIC GESTATION.

IN the *Australasian Medical Gazette*, Dr. Worrall records an interesting case in which two extra-uterine pregnancies developed within seven months in the same patient.

The patient, a multipara, having missed the menstrual period due about Christmas 1895, was suddenly seized with severe abdominal pain and symptoms of intense shock on 1st January 1896. As the sign indicated a ruptured tubal pregnancy, laparotomy was performed. Much blood was found in the peritoneal cavity, and in the posterior layer of the right broad ligament was a ragged opening, the size of half a crown. The intestines were greatly distended, intensely congested, and roughened with lymph. Ligature and removal of the bleeding sac was easily accomplished, and the woman made an uninterrupted recovery. On 20th August of the same year the author was again sent for, the history being that since the last operation the patient had been quite well, and menstruation regular till 1st August, when she missed the period due on that date, and next day was attacked by a violent pain in the lower abdomen. In the course of a few days a hæmorrhagic vaginal discharge appeared, and had continued ever since. She was now in an extremely critical state, blanched, vomiting, and complaining of agonising abdominal pain, most marked on the epigastric region. The abdomen was much distended, and on vaginal examination an exquisitely tender fulness could be made out in the left fornix anteriorly.

Abdominal section was again performed, and a large quantity of blood found in the peritoneal cavity. The hæmorrhage was found to come from the dilated left Fallopian tube, which, though unruptured, held entangled by its fimbria a tubal mole. After ligature and removal of the tube, the abdominal cavity was flushed out with saline solution and a drainage tube inserted. The patient recovered uninterruptedly.

A similar case occurred in the practice of Professor Engstrom, in which he operated for intermittent pain and irregular uterine discharge, and found the right tube distended with a gestation sac of recent growth, while in the ampulla of the left tube was a cavity in which there were fœtal remains. The history of this patient showed that two years previously she had suffered from almost precisely the same symptoms for which she had now been operated upon. In recording this case, thirteen similar cases of repeated extra-uterine gestations have been collected by Forsström.

PRIMARY TUBERCULOSIS OF THE BREAST OCCURRING DURING PREGNANCY.

AN interesting example of this rare condition is reported by E. P. Davis. The patient, 17 years of age, and seven and a half months pregnant, complained of severe pain in the right breast. The organ appeared swollen, and felt firm and indurated, but at the same time was freely movable, the induration being exclusively confined to the gland itself. There was no involvement of the axillary glands, or evidence of fluctuation or rise of temperature. Her family history was good, while her own health previously had been fair. The secretion squeezed from the breast showed on examination tubercle bacilli. The question of immediate operation was discussed, but the patient being in a weakly condition, it was determined to wait till after the puerperium. Beyond a steady increase in size of the breast, no untoward symptoms supervened, and an apparently healthy full-time child was delivered. No tubercle bacilli could be detected in the placenta. The mother's convalescence was uninterrupted.

The breast was amputated six weeks later, and on examination showed multiple abscesses in the acini. A hard mass in the upper portion contained a considerable amount of pus. In the lower portion a small adenomatous tumour was present.

Microscopic examination of the pus showed many tubercle bacilli and micrococci. She made an excellent recovery from the operation, and no evidence of a similar affection in the other breast showed itself.

But few examples of this condition during pregnancy are recorded. Powers, in the *Annals of Surgery*, reports a case, and records thirty-seven others collected in surgical literature.—*Canadian Journ. of Med. and Surg.*, August 1897.

DIFFERENTIAL REACTION OF WOMAN'S AND COW'S MILK.

AMONG a series of investigations on the albuminoids of human and cow's milk, Urnikoff demonstrates that the addition of ammonia to woman's milk causes a dark red coloration, while on cow's milk no such change is elicited.

According to the amount of ammonia added, the more pronounced is the reaction, the colour passing from red to violet on increasing the amount of the reagent; the minimum quantity of ammonia capable of giving a violet tint being a drop of a 10 per cent. solution to 5 c.c. of milk. This reaction is accentuated by heating the milk to 60° C., while, on boiling, the violet hue is changed to brown.

Perhaps its most practical bearing is derived from the fact that the more intense does the reaction become the greater the length of time after the confinement; thus it might be used with advantage in testing the accuracy of the statements of wet nurses.—*L'Obstetrique.*

THERAPEUTICS.

UNDER THE CHARGE OF

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CINNAMIC ACID IN TUBERCULOSIS.

HEUSSER (*Therap. Monatsh.*, Berlin, Sept. 1897) gives an account of twenty-two cases of pulmonary tuberculosis treated by cinnamic acid. He considers that the attempts to kill the bacilli *in situ* have hitherto ended in complete failure; that a *restitutio ad integrum* is only possible in the very earliest stages, when diagnosis is very uncertain; and that cure can only be expected by exciting artificially an inflammation around the tubercular nodule, which may ultimately lead to cicatrisation. Landerer ("Die Behandlung der Tuberculose mit Zimmtsäure," Leipzig, 1892) first pointed out that cinnamic acid and its salts induce an increase of white blood corpuscles, which reaches its height in eight hours, and subsides in about twenty-four hours. As a consequence, an aseptic inflammation occurs in the neighbourhood of the tubercles, consisting in dilatation of the blood vessels, emigration of leucocytes, and serous infiltration. In about three weeks a wall of leucocytes is formed round the tubercle, and shuts it off. At the same time the leucocytes penetrate the tubercular mass, and small blood vessels form in it; then connective tissue also forms in it, and shrinking takes place. There is a certain degree of interstitial pneumonia in the neighbourhood. Calcification may finally occur, and the bacilli ultimately die. Landerer gave the cinnamic acid by intravenous injection dissolved in glycerin, but Heusser found it more convenient to inject the solution into the gluteal region. He begins with 0·1 of a 5 per cent. emulsion, and gradually raises it to 1·0, where he stops. The injections are sometimes painful, especially if not thrown deeply into the muscle. Heusser then recounts shortly the clinical history of his twenty-two cases, and classes them as cured six, improved twelve, died one, unchanged three. Treatment extended over several months (five or six), by which time the bacilli have usually disappeared from the spit, but improvement in symptoms is observed a good deal earlier. Although perfectly safe, this method of treatment demands great patience on the part both of doctor and patient, and must be persevered in for months before any striking benefit is observable.

In conclusion, Heusser formulates his opinion—

1. That cinnamic acid powerfully influences tuberculosis.
2. Gluteal injection of its solution is harmless.
3. Such injections gradually bring about cure in a number of cases of pulmonary tubercle.
4. It is not a specific against tubercle.

FORMALDEHYDE (FORMALIN).

LEDERLE (*New York Med. Journ.*, Oct. 16, 1897) gives an account of the chemistry of formaldehyde in relation to its use as a disinfectant. Formic aldehyde, formaldehyde, the aldehyde of methyl alcohol (CH_2O), can be prepared by the oxidation of methyl alcohol thus—$CH_3OH + O = CH_2O + H_2O$. At ordinary temperatures it is a colourless gas, having a very irritating effect on mucous membranes; at low temperatures it tends to polymerise, forming paraformaldehyde, a white body, unctuous to the touch, and somewhat insoluble in water, or trioxymethylene, a white powder, also very slightly soluble in water. The former is supposed to consist of two and the latter of three molecules of formaldehyde. Commercially, formaldehyde is prepared by projecting jets of vapour of methyl alcohol into a heated copper tube containing porous substances, the vapour being led into a series of chambers containing water, which dissolves the gas. In this manner a watery solution of formaldehyde as strong as 40 per cent. may be prepared. To all the higher forms of life, formaldehyde appears to be non-toxic. In man the first effect of the vapour is a severe irritation of the mucous surfaces of the eyes and nose. Animals have been kept for hours in rooms charged with its vapour and no ill effects have been noticed; flies and insects in general are not affected by it. Weak solutions have been swallowed without injury. Nevertheless, it has powerful antiseptic properties, and in 1891 Trillat declared it to be more effective than any of the other known non-toxic antiseptics. It should not be used to preserve foods, as it renders albumin very insoluble and more difficult to digest, and it interferes with the digestive processes directly. It appears in commerce chiefly in the form of a solution of the gas in water, which is called formalin (a trade mark) and formol. Such solutions are usually stated to contain 40 per cent. of the gas, but analysis of six different samples only gave from 25 to 39 per cent. They are colourless liquids, having an acid reaction and a pungent odour. All of them contain the three polymers and not simply the gas in solution, and always more or less methyl alcohol.

For disinfecting purposes the gas may be generated from methyl alcohol in a lamp of special construction, the alcohol being oxidised during combustion by means of various devices. With all of them there is a certain risk of fire. The best plan is to use a specially constructed autoclave, heated by gas or oil. In it a solution of formaldehyde is heated under pressure with calcium chloride, when the gas is liberated in large quantities in a comparatively dry state, and can be conducted through a tube to the place or chamber which is to be disinfected. It may also be generated from the solid isomeric compounds; but hitherto this method has proved too costly for use on a large scale.

Almost all the mineral, animal, and aniline colours are unaffected by formaldehyde, an important fact in connection with house disinfection. The exceptions are a few delicate aniline reds, which are changed to purple or blue by its action. The fuchsines are all sensitive to it, but paper soaked in magenta forms the best test for its presence, and is most useful in conducting experiments on its power of penetration. The pink shade of the paper is changed to purple or blue by traces of formaldehyde.

In the same number of the journal, Doty discusses the value of formaldehyde as a disinfectant. After pointing out that chlorine gas is now practically little used, and that sulphurous acid gas and steam compete for favour as disinfectants, he states that the former is often objectionable on account of its strong bleaching properties, and that the latter cannot be used for the disinfection of houses; hence the necessity of a disinfectant which can at times be used in place of steam or sulphur dioxide has been urgently felt.

The experimental work was carried out at the New York Quarantine Station. The aim was to ascertain the germicidal power of the gas upon exposed surfaces, and also its penetrative power. Consequently the micro-organisms were not only directly exposed to the gas, but were placed inside sterilised blankets, newspapers, and other packages. In order to keep on the lines of quarantine work, pathogenic organisms only were used—bacilli of cholera, anthrax, diphtheria, and plague. The details of the experiments are too long to give, but these various fabrics were exposed in a large chamber in which the gas was generated, or into which it was forced. From the results he deduces the opinion that formaldehyde cannot be relied upon where deep penetration is required. It can, however, penetrate letters and other thin packages, if placed in an air-tight chamber. On packages of clothing, blankets, etc., its action is uncertain. As a rule the organisms are not killed. For superficial disinfection it is of great value, more especially as it is non-injurious, as a rule, to the finest fabrics.

Some form of autoclave is the best method of generating the gas, and the exposure should extend over several hours.

Bismuth Poisoning.

Bismuth is not much used in this country as a surgical dressing, but on the Continent it is pretty largely employed, and especially in various forms, as a substitute for iodoform. When it is taken internally it is either not absorbed from the alimentary canal, or in such very minute amount that poisonous symptoms following its use are practically unknown. Nevertheless, when it does find entrance to the circulation, it causes a series of very definite and well-marked toxic phenomena. Aemmer records such a case (*Cor.-Bl. f. schweiz. Aerzte*, Basel, 15th August 1897), where he used the gallate of bismuth oxyiodide (airol) by injecting about 10 drms. of a 10 per cent. emulsion into the cavity of a psoas abscess after evacuating the pus. Two days later the patient experienced burning pains in the lips and gums, which interfered seriously with chewing, then stomatitis with fœtor followed. There was difficulty in swallowing, headache, general malaise, loss of appetite, nausea, and slight constipation, but no fever. The gums, tongue, and hard palate were of a bluish colour, and the pharynx reddened; both lips were greatly swollen. Along the inner aspect of the cheeks, where the teeth exert a slight pressure, the bluish line was also well marked. There were small ulcers here and there, and the submaxillary lymph glands were swollen. The stomatitis improved under treatment with potassium chlorate mouth-wash, but the general symptoms continued until the abscess was freely opened and the airol washed out of it. The pigmentation remained, and was quite visible four weeks later.

No bismuth was found in the urine. Glycerin was used in making the emulsion originally injected into the abscess, and as this menstruum dissolves airol, absorption probably took place directly. Kocher has reported six cases of bismuth poisoning with the subnitrate used as a dressing, one of which ended fatally; and Wiesner has reported one case occurring after the use of dermatol (bismuth subgallate). The symptoms in these cases were very much as reported above, stomatitis being the most outstanding feature.

PATHOLOGY AND BACTERIOLOGY.

UNDER THE CHARGE OF

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Adrenal Growths.

Kelynack (*Med. Chron.*, Manchester, September 1897) in an instructive paper draws attention to this subject. He refers to the importance of a systematic study of such cases, the serious general symptoms to which such growths may give rise, and the bearing they may have upon the etiology of kidney tumours. He restricts his observations to growths of the normal adrenal, thereby excluding neoplasms occurring in connection with accessory adrenals or adrenal "rests." *Benign growths.*—

The adenoma is the most frequent form. After referring to the views of Virchow, Rolleston, and Letulle, he mentions that this growth is by no means common. He has met with only three well-marked examples in over 1500 post-mortems in the pathological department of the Manchester Royal Infirmary. It forms a diffuse or localised growth of a yellowish white colour, not unlike the normal adrenal cortex. Sometimes it is pink or red, and small cyst-like formations may appear. The shape of the gland is generally preserved even when greatly enlarged, the surface smooth, even when firmly adherent to the adjacent kidney. In structure they show a fibrous stroma, varying in age and amount and vascularity. The cellular elements between the fibrous strands sometimes resemble normal adrenal tissue, but sometimes differ therefrom in various ways, such as indefinite branching, or in the formation of spaces. Fatty degeneration, pigmentation, and complete breaking down is often seen in the cells. He makes a brief reference to cases published by Ogle, Sibley, etc., as probable examples of this form of growth. Bland Sutton's case of adenoma in the adrenal of a marmot stands alone in having similar nodules (secondary?) in the liver. The author speaks also of fibroma, lipoma, glioma, angioma, and lymphangioma, and considers that many of the cases described under the first two of these groups have really been modified adenomata. *Malignant growths.*—He points out the difficulties we have to contend with in the literature of this subject, as many authors have given such scanty information on important points as to render their communications almost worthless. He quotes Rolleston to show that secondary deposits in the suprarenals occur in about 11 per cent. of carcinoma and 8 per cent. of sarcoma of various parts of the body. He then reviews the recorded cases of primary cancer of the adrenals, and comes to the conclusion that it is excessively rare. Sarcoma is next considered. It is the usual form of primary malignant growth in the adrenal. The author points out that the most complete article on the subject was published by Affleck and Leith in 1896, and refers in detail to their case, and notices the other published cases, some sixteen in all. A well-described case by Coats in *The Glasgow Medical Journal* has been overlooked. The author also gives particulars of another interesting case of a sarcomatous-looking tumour of the adrenal in the Museum of the Royal College of Surgeons of England (No. 3518D), brought under his notice by Mr. Targett, and concludes by urgently desiring that every case of adrenal growth may be submitted to full investigation, in the hope that we may thus gain more definite knowledge of the subject.

AORTITIS.

BOINET and Romary (*Arch. de méd. expér. et d'anat. path.*, Paris, Sept. 1897) have conducted an experimental research on this subject, and summarise their conclusions under the following heads:—(1) *Traumatism.*—Rigorously aseptic traumatism does not determine aortitis. It merely weakens the natural resistance and creates conditions of receptivity favourable to aortic lesions of an infective or toxic nature. It is merely adjuvant. In some of their cases they found that it left no traces at the autopsy, and in others aortic lesions of infective or toxic origin were able to develop on points inaccessible to traumatism.

(2) *Infective microbes.*—Crocq says that the bacillus of endocarditis, described by Gilbert and Lion, is alone able to produce, and that only very exceptionally, acute infectious aortitis, without previous alteration in the vessel wall. Thérèse failed to obtain any lesions of the inner wall after injections of various microbes (B. coli commune, streptococcus, staphylococcus, and attenuated diphtheritic bacillus), but observed an embryonic infiltration of the under coat. The authors were, however, able to obtain both patches of aortitis and an embryonic cellular invasion all round the vasa vasorum in animals subjected to injections of Eberth's and Löffler's bacilli, without previous aortic traumatism. In other cases, several of the patches of infectious origin were in places too far removed to have been influenced by traumatism. As a general rule, however, they agree that a previous local diminution of resistance is necessary for the production of an infectious aortitis, and that this is brought about experimentally by traumatism, and clinically by a previous lesion, or by some nutritive change in the vessel wall. The microbe (and the particular microbe injected has a certain influence) must be in many cases implanted upon a spot prepared to receive it. (3) *Toxins.*—The toxins of certain organisms (diphtheria, tubercle, cholera, and streptococcus), separated by heat or filtration, were found to produce acute patches of aortitis, when injected subcutaneously or into the veins, after a previous traumatism, and in other cases without it. Histologically, those experimentally produced toxic or infectious patches of aortitis resemble the gelatinous swellings seen in the aorta. Further, if the microbe be strongly attenuated, changes of a subacute character, with a tendency towards chronicity, can be obtained. An arteriosclerosis may result if the animals be kept long enough under observation, due to the formation of young connective tissue cells and of fibres. This was most marked in the author's experiments, in the aorta of a horse immunised by many injections of diphtheritic toxin. The virulence of the toxins, the doses, the number of injections, and the period over which they are spread, are all concerned in the result; and by variations in them it may be possible to produce all the intermediate changes between acute and chronic aortitis. In this way the lesions of the aorta seen in typhoid fever, and the eruptive fevers, etc., may be explained. (4) *Intoxications.*—Experiments with lead, uric acid, urate of soda, and phloridzin produced somewhat similar results. Conditions approaching lead poisoning, gout, and diabetes were produced in guinea-pigs, etc., and patches of aortitis were found, varying in acuteness according to the strength and frequency of the doses, as in the case of the toxins. The chronic character of the lesions met with clinically probably found its explanation in the slowness, intermittency, and feebleness of the action of the poison. Histological examination of these experimental lesions gave in all cases the same results, and enabled the observer to follow the various phases existing between the acute, subacute, and chronic aortic inflammations. The different microbes, their toxins, the separate non-organismal poisons, their doses, virulence, and frequency, all have an influence. Their combination (fevers, malaria, syphilis, gout, alcohol, etc.) explains the frequency of aortic lesions of a chronic character found in man.

LOCOMOTOR ATAXIA.

PHILIPPE (*Arch. de neurol.*, Paris, September 1897) has contributed a well-illustrated study, from an anatomico-clinical standpoint, of the medullary localisations in this disease. He first considers the topography of the lesions, after a new architecture of the posterior columns. He rejects all the methods of determination, except that of secondary degeneration. His arrangement can be easily followed by a reference to his figures. He then discusses the histological nature of the tabetic processes, classifying them as interstitial and parenchymatous. The former he regards as entirely secondary to the latter, which is the primitive change. It affects the posterior roots and posterior columns, but leaves the intervertebral ganglia intact. The change affects the myelin sheath, bringing about a segmentation and granular degeneration, resulting in atrophy. The nuclei of the nerves are not multiplied, but the exact condition of the axis cylinder was not determined. It probably remains more or less intact for a long time. The evolution of tabes follows two types, the benign and the grave. In the latter the lesion is in the cord, resulting in very rapid destruction of the endogenous zones of the posterior columns, both ascending and descending. In the former, on the other hand, the lesion is in the posterior roots, outside the cord, and has little tendency to spread. It is these that especially exhibit pains, while numbness and tingling indicate rather an affection of the cord. Motor inco-ordination does not necessarily follow a lesion of the "bandelettes externes."

DERMATOLOGY.

UNDER THE CHARGE OF

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ECZEMA AND PSORIASIS OF THE SCALP.

JOSEPH defines eczema of the scalp as "a superficial catarrh, with marked serous exudation." We may regard an artificial dermatitis, evoked by external irritation, as the type of this catarrh. Hebra observed that an inflammation of the skin produced by croton oil, one of our strongest irritants, is essentially the same as acute eczema. Later observers, particularly Unna and his school, insist that there are important differences. Of these a prominent one is, that an artificial dermatitis disappears so soon as the irritant ceases to act, while in eczema there is extension of the disease, in accordance with the nature of the yet undiscovered cause. It is sometimes true that an artificial dermatitis, induced by the application of an external irritant, does disappear when this is no longer efficient, yet frequently it leaves behind an eczema, which may last weeks or months. It is customary to assume a predisposition to eczema, which is little more than a confession of ignorance. It is not disputed that there are contributory elements in individual constitutions, but such play a subordinate part. Dermatitis due to pediculi affecting the scalp does not cease with the destruction of the parasites. And there is an acute form of eczema, sometimes called idiopathic, whose cause we do not know, which runs the same course and presents an identical clinical aspect. Eczema of the scalp is not easy to describe, since the inflammatory phenomena vary in quality in accordance with the intensity of the irritant and the state of the skin. In general, three grades can be differentiated, but age must be taken into consideration. It is most frequent in childhood, and in early infancy is a veritable calamity. The first appearances may attract little attention, and the outbreak is sometimes acute, with copious oozing and crusting over the head, even including the face. Or a circumscribed portion of the scalp becomes reddened and covered with a yellowish fatty deposit. If this fatty deposit, a mixture of abnormally cornified and therefore fattily degenerated epidermic cells and sebaceous matter, is carefully removed daily with pure olive oil, and the entire area spread with 5 per cent. borated vaselin, the complaint soon lessens, diminishes in extent, and in no long time is cured. But this is often aggravated by too frequent washing, with the view of cleansing the head, and so an acute eczema arises. There is no doubt that a great many cases of eczema in quite young children are due to too frequent and too energetic washing. Such eczemas rapidly get well, if all washing be discontinued and a simple salve applied, renewed twice a day, and in some instances aided by bandaging. But from early childhood to puberty more severe examples occur. The whole head is covered with thick, yellow, dirty crusts; the hair is matted together, and a disgusting odour is exhaled. If the crusts are raised with difficulty, the underlying scalp is seen to be reddened and weeping. This condition is commonly occasioned by pediculi capitis, and the possibility of their presence should never be overlooked; their destruction is generally followed by speedy cure. In later life this etiological element largely disappears, and acute weeping eczemas of the scalp are less common. Whether the soil is less suitable, or the external irritants are infrequent, is uncertain. Both in men and women of middle age, hair restorers and hair dyes may cause an acute eczema. Treatment is eminently successful in these acute, weeping, impetiginous, crusted eczemas. Though it has been laid down that in such the hair must be cut, it is possible to cure without having recourse to a measure so disfiguring. The first item of cure is total discontinuance of washing with soap and water. Solution of the crusts by means of oil is unnecessary, unless in instances where the deposit is very considerable. The following ointment, originally suggested by Biett, is rubbed in with a stiff brush thickly, night and morning, on all the eczematous parts, for several days, the previous layers being left undisturbed:—℞ Hydrarg. sulphureti rubri, 1·0; sulphuris sublimati, 24·0; bergamott. gutt., 25·0; vaselini flavi ad 100·0.—*O.M.* Only in course of four to five days is an effort made to remove the ointment and crusts, primarily with a piece of flannel soaked in oil, subsequently by washing with lukewarm water and a non-irritating soap, such as Heine's centrifuged infant soap. Should the disease not be got rid of, the procedure is to be repeated. Even in the worst cases two or three courses suffice. The oozing wil have ceased, the crusts have fallen off, and a diffusely reddened surfac remains, on which a slight desquamation is perceptible. This can b removed by a nightly inunction with olive oil, or 5 per cent. borated vaselin, or the following combination:—℞ Acidi salicylici, 1·0; tinct. benzoini, 3·0; vaselini flavi ad 30·0.—*O.M.* When all inflammation has entirely subsided, and there is no tendency to the recurrence of oozing, the head may be washed, but must be often oiled to obviate relapses. Should pediculi be present, they must first be got rid of. This is most simply effected by using sublimate vinegar (hydrarg. perchlor., 1·0; aceti communis, 200·0). The vinegar dissolves the chitin cement with which the eggs are attached to the hairs, the sublimate kills the pediculi. Joseph regards as distinct the seborrhœa sicca with gradually progressive baldness, originally described by Hebra, and the seborrhœic eczema, or dermatitis, formulated by Unna. In seborrhœa sicca there is at first a pure hypersecretion of the sebaceous glands, to which there is subsequently added an abnormal and excessive cornification of the epidermis, the parakeratosis of Unna. In seborrhœic eczema of the scalp, the feature of eczema, the superficial catarrh, comes to the front. Thick fatty scales, which still plainly indicate their origin from vesicles, are seen, seated on a reddened ground, often not so manifest in the centre of the diseased area as at the periphery, and apt to be overlooked in consequence of the heaped up sebaceous material. Particularly suggestive is the crescentic, sharply-defined red edge at the hair margin, on the forehead and nape of the neck. On the temples, near to and frequently involving the auricle and the furrow between this and the side of the head, reddening, œdema, tension, weeping and crusting are found. This purely catarrhal affection, with all the signs of inflammation combined with increased sebaceous secretion, ought alone to be regarded as seborrhœic eczema of the scalp. Joseph rejects Unna's idea that the fatty investment is derived from the sweat glands as a consequence of their increased activity. He considers this as not proved, nor even inferred. Though seen in cases where there exists a follicular or seborrhœic eczema on the chest, it occurs independently of this. It may be an infectious catarrh, but this needs confirmation, and the rival claims of Unna's morococci and Sabouraud's bacilli need further observations to dispose of them. The cure, if treatment is persisted in, is not difficult. The head should every evening be washed over with—℞ Tinct. cantharid., 4·0; spt. lavand., spt. rosmarin., ana 50·0; then anointed with the following pomade—℞ Resorcini, 1·0; sulphuris præcip., 4·0; vaselini flavi ad 50·0. The diagnosis of psoriasis of the scalp is not always easy. In many instances the disease is also present on other typical localities, but sometimes the scalp is alone attacked. However extensive it may be, there can be found somewhere an isolated patch. A small tuft of hair seems implanted in a well-defined area of reddened skin, covered with thick, whitish scales. If these are scratched off with the nail, the hair does not come out, but a number of minute drops of blood well up. In treatment the scales must first be thoroughly removed, either by washing with sp. saponis kelinus and warm water, or by using the oil recommended by Neisser—℞ Acidi salicylici, 10·0; ol. olivæ, ol. ricini, ana ad 100·0. When this has been accomplished, a 10 per cent. pyrogallic acid salve may be applied every evening. Sometimes a 10 per cent. gallanol ointment surpasses it in activity and rapidity of cure. It is of great importance to prevent recurrences, to attend particularly to the hygiene of the scalp. The head must be kept scrupulously clean by washing with a suitable soap. Residence in warm climates exerts a beneficial effect; diet, on the contrary, very little.—*Berl. Klinik*, August 1897.)

THE EPITHELIAL NATURE OF NÆVUS CELLS.

UNNA remarks that the little growths popularly known as soft moles have scarcely attracted much notice from the profession, but the attention of pathological anatomists has frequently been directed to them, on account of the peculiar cells they contain. These have long been looked on as epithelial inclusions in the connective tissue—misplaced embryonic growths, according to Cohnheim's view. But this does not exhaust the interest in such moles, since with them is bound up a larger scientific question—how certain malignant tumours are to be regarded, which have sometimes been classed as sarcomata, sometimes as carcinomata. Should, then, the epithelial nature of the nævus cell be accepted by the majority of anatomists, this will necessarily open the way for the pathologist, when it is seen that any other view is irreconcilable with so many accepted pathological theories. The nævus cells are found in very various numbers in all soft moles, in the form of solid groups, balls, cords, and larger masses, more rarely single. They are simply deposited without the intervention of any investing membrane in the connective tissue, which, except that it contains fewer elastic fibres, is otherwise normal. These cells are distinguished by two peculiarities, more manifest near the surface, where they are less compressed. First, the vesicular form and considerable size of the nucleus; and, second, the complete absence of fibrillar connective tissue between the cells within the groups. They differ from the surface epithelium in that their protoplasm is less amenable to staining, and in the absence of prickles; thus they have more affinity with gland epithelium. From the developmental point of view, the nævus cells are only snared off epithelia deposited in the connective tissue. This can be determined by examining such moles taken from the cadaver of new-born or young infants, in which can be seen—(1) Epithelial proliferation; (2) metaplasia of the epithelium, namely, a structural and tinctorial change in the epithelial protoplasm; and (3) the snaring off of the epithelium, and its deposition in the connective tissue of the corium. Variations in the degree of these account for differences in the forms of the nævi of children. These can be divided into four categories—(1) Those with simple epithelial proliferation; (2) those in which to this is superadded metaplasia, and snaring off after a thoroughly concordant fashion; (3) those in which metaplasia of the prickle cells follows closely on the epithelial proliferation, but the snaring off of the metaplastic parts is disproportionately delayed; (4) those in which the epithelial proliferation, the metaplasia, and the separation occur so harmoniously that there is no increased accumulation of epithelium on the surface of the nævus. It may be objected that the cell masses in the cutis are not epithelia, but endothelia, but three circumstances militate against this. There is nowhere any indication of cell proliferation in the cutis and vessels, which is necessary as the basis of a connective tissue theory of the origin of the cell masses. And not only are changes to be found in the surface epithelium, but also in that of the hair follicles and sweat ducts. Besides, the prickle layer in these organs is proliferated here and there, and more than that altered metaplastically. This in addition favours the hypothesis that the nævus cells in the adult are in part derived from the prickle layer of the epidermic appendages.—*Deutsche Med.-Ztg.*, Berlin, 21st June 1897, S. 395.

DISEASES OF CHILDREN.

UNDER THE CHARGE OF

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CHRONIC NEPHRITIS AND ALBUMINURIA IN CHILDREN.

PROFESSOR HEUBNER, at the International Congress of Medicine at Moscow, described a form of nephritis which he did not regard as belonging to any of the well-recognised groups, and which he designated a prolonged scarlatinal nephritis. Cases of acute or subacute albuminuria, developing during the course of scarlet fever, are apt to become chronic, and in spite of the patient being subjected to careful and vigorous treatment, small quantities of albumin and tube casts remain in the urine for indefinite periods. The subjects of this chronic nephritis do not complain of headache, vomiting, diarrhœa, nor sleeplessness, nor of any of the ordinary symptoms pointing to kidney mischief. There may be slight pallor and general want of tone, but we never meet with dropsy, retinitis, cardiac hypertrophy, nor increased arterial tension. The diagnosis depends entirely on the examination of the urine, which contains albumin in a greater or less quantity, and a small number of hyalin casts. The quantity, colour, reaction, and specific gravity of the urine are normal, and neither epithelial nor granular tube casts are ever present. The author believes that a similar condition sometimes supervenes after other infectious diseases, especially diphtheria, measles, and influenza, and that in many cases there is a hereditary element to be taken into account, as he has met with instances of this chronic albuminuria in several members of the same family. The majority of cases commence in children between the ages of 6 and 14; but it is by no means uncommon to find it developing in quite young infants. A case is quoted in which the albuminuria appeared in a child of 18 months old, during the course of an indefinite eruption. At 7 years of age the boy developed scarlatina, which gave rise to an increase in the amount of the albumin without inducing an acute nephritis. The progress of the malady is essentially chronic, lasting in some cases for twenty years, without undergoing any modification. Under the influence of a milk diet and rest in bed, the albumin may disappear for a time, but it almost invariably reappears. The prognosis, so far as recovery is concerned, is unsatisfactory, although in a small proportion of the cases there is a history of a cure having been obtained after the albuminuria had persisted for many years. In such cases there is always a great tendency to relapse. Treatment appears to be absolutely ineffectual;

neither rest in bed, milk diet, tannin, cod-liver oil, nor the iodides of iron have any permanent effect on the nephritis. The main indication is to guard against cold, and perhaps to obtain this end residence in a warm climate should be recommended.—*Gaz. hebd. de méd.*, Paris, 2nd September 1897.

A Case of Congenital Stenosis of the Pylorus.

Dr. Ashby gives the following details of a case of this interesting condition which came under his notice. The infant, who was plump and healthy when born, was fed on the breast, and continued well until the end of the first week, when vomiting commenced, and large quantities of milk which had collected in the stomach were brought up. Milk was retained for short periods, but was always vomited eventually, and more milk appeared to be brought up than had been swallowed. No bile was ever detected in the vomited matter, and the stools were very small and constipated. This persistent vomiting soon brought about wasting and emaciation, and a few days before death convulsions, drowsiness, and Cheyne-Stokes' respiration supervened. The child lived for seven weeks, during which time no tumour could be detected. At the post-mortem examination the muscular walls of the stomach were found to be greatly hypertrophied, and there was irregular contraction of the muscular fibres, giving the organ a sacculated appearance. At the pylorus a hard rounded mass was discovered, resembling a scirrhous tumour. A section through the walls of this mass showed it to be composed of swollen mucous membrane and greatly hypertrophied muscular tissue. The pyloric opening was so contracted that it was only with the greatest difficulty that the contents of the stomach could be made to pass through it. Dr. Ashby has no satisfactory explanation to give of the pathology of these curious cases. He believes with Henschel that congenital obstruction of the alimentary canal often runs in families, and he has met with five children of the same mother who all died shortly after birth from some form of intestinal obstruction.—*Arch. Pediat.*, N. Y., July 1897.

The Nature of the Night Terrors of Infancy.

The condition described under the name of night terrors is merely a manifestation of infantile neurasthenia, and is principally observed in nervous, irritable, and impressionable children, whose sleep is light and restless, and who are easily disturbed. It is one of the manifestations of want of nerve control, resembling in this respect the nocturnal incontinence of urine. Under these circumstances, with a badly balanced nervous system, the least excitement, which would have no effect on a healthy subject, will suffice to provoke a dream full of the most terrifying suggestions. Another point of resemblance with neurasthenia is furnished by the headaches, palpitations, and easily induced muscular fatigue which the subjects of these conditions share. In a certain number of these cases the children manifest evidences of hysteria, or hypochondriasm, and ultimately not a few develop epilepsy. The treatment is the same as that employed in neurasthenia, namely, dietetic and hygienic. If the child dreads sleeping alone, he should not be compelled to do so, and sedative drugs, such as the bromides and chloral, may be administered.—*Jahrb. f. Kinderh.*, Leipzig, 1896, S. 407.

TANNALBIN AS AN INTESTINAL ASTRINGENT.

PROFESSOR VIERORDT of Heidelberg strongly advocates the use of tannalbin in cases of acute and chronic intestinal catarrh, and also in tubercular diarrhœa.

Tannalbin is a brown, tasteless powder, containing about 50 per cent. of tannic acid. It is insoluble in the mouth and stomach, but on meeting with the alkaline secretions of the intestines it is resolved into its original elements, tannin and albumin.

The action of the drug on most of the cases of diarrhœa treated was most remarkable, causing very rapid diminution in the number of the motions and in the quantity of mucus passed. The dose for children varies from 4 to 8 grs. The writer places tannalbin without hesitation in the first rank of astringent preparations, and regards it as a most reliable drug in the treatment of all kinds of diarrhœa, whether simple or tubercular, and it possesses the advantage of causing neither dyspepsia nor loss of appetite. From the experience which he has had of the administration of tannalbin, he considers it a more reliable drug than bismuth in the treatment of infantile diarrhœa.—*Deutsche med. Wchnschr.*, Leipzig, 1896, No. 25.

CONGENITAL AND PROGRESSIVE HYPERTROPHY OF THE SUBLINGUAL GLANDS IN A NEW-BORN INFANT.

THE child was taken to the Children's Hospital when six months old. Several days after birth it was noticed that there was difficulty in nursing. On examining the mouth, a bilateral tumour at the base of the tongue was discovered, which was at first considered to be a double congenital ranula. As the tumour grew, the difficulty in suckling increased, and the child rapidly lost flesh and became atrophic. The appearance presented on looking into the mouth was as if there was a second tongue below the normal one, but separated from it by a deep groove, in the centre of which Wharton's two ducts opened side by side. The tumour was depressed on its upper surface, where it formed a cavity, into which the lower surface of the normal tongue was moulded. The tongue itself was slightly mobile and greatly swollen. A close examination showed the tumour to be formed of two symmetrical halves, closely connected in front at the median line, and occupying the site of the sublingual glands. In front they were separated from each other by Wharton's ducts, while behind they were diverted a little from the median line. The whole tumour was bound down by a frenum to the floor of the mouth, and had a flabby, non-fluctuating consistence. The mucous membrane was paler than normal. The tumours were removed and healed by cicatrisation. The author believes that the condition was either a congenital glandular hypertrophy tending to increase after birth, or a congenital dull chronic inflammation, connected either with a torpid infection, or poisoning from some unknown cause.—*Rev. mens. d. mal. de l'enf.*, Paris, September 1897.

REPORTS OF THE MEDICAL SOCIETIES.

◆

Edinburgh Medico-Chirurgical Society.—*1st December* 1897.—Dr. **Batty Tuke**, President, in the chair. **Patients** were shown by Dr. J. W. **Martin** and Dr. **Allan Jamieson**.

Specimens were exhibited by Mr. **Alexis Thomson**, Dr. **Harvey Littlejohn**, and Mr. **Cotterill**.

Dr. **Affleck** showed a phonendoscope adapted for teaching purposes by means of long rubber tubes.

Dr. C. B. **Ker** then read a paper on the "Serum Reaction of Typhoid Fever." This test had been applied to every case sent in as typhoid to the Edinburgh City Hospital since February last, and the results obtained were as follows:—169 cases in all were examined; of these, 121 gave the reaction and forty-eight gave no reaction. Of the cases that gave the reaction, eight were proved post-mortem to have been typhoid, ninety-nine were proved clinically to be typhoid, thirteen were probably enteric in the convalescent stage, and one case was probably not typhoid but typhus fever, and yet gave the reaction on three different occasions. Of the forty-eight cases that gave no reaction, three were proved post-mortem not to be typhoid, forty-one were clinically diagnosed not enteric, one was probably not enteric, and three were possibly enteric. Emphasis was laid on the fact that the reaction may be got even with normal blood serum, if it be not sufficiently diluted. A dilution of one part of serum in thirty of sterilised bouillon was used in the above experiments.

In the discussion which followed, Dr. Noël Paton gave the following results of experiments made in the Royal College of Physicians' Laboratory:—Of sixty-four cases examined, twenty-five gave the reaction, and thirty-nine did not. Of the positive results, one was undoubtedly not typhoid. Of the negative results, one case was clinically proved to be typhoid.

Dr. **Foulis** read a paper on "Cyanosis in Convulsions—how Caused, and how Prevented," in which he showed, by limelight views and by certain experiments, that the cyanosis is due to the obstructions offered to the free ingress of air into the lungs by the falling back of the tongue on to the wall of the pharynx. By simply lowering forward the base of the tongue, this obstruction is done away with, air passes in freely, and the cyanosis rapidly disappears. The same manœuvre may be employed in cases of interference with the breathing in chloroform cases. Pulling forward the tip of the tongue when the tongue muscles are lax is not nearly so useful.

Dr. **Allan Jamieson** read the paper on Eczema Palmare and Plantare which appears in this number of the Journal.

Edinburgh Obstetrical Society.—*Wednesday, 8th December.*—Dr. **Halliday Croom**, President, in the chair.

Dr. **Moir** read a paper on "The Induction of Premature Labour," and gave a record of his experience with this operation. He strongly advocated more gentle methods than were now resorted to, and urged that gradual dilatation of the os uteri day by day, by means of the fingers, was the best mode of operation. Occasionally the introduction of graduated bougies might be necessary, but in nearly all his cases he had succeeded in attaining his object without any form of instrumental aid. Dr. Moir recorded a remarkable series of cases, some of them dating as far back as 1833. One table he quoted showed the gratifying result of twenty-four cases, with no maternal deaths, and seventy-two children, of whom fifty-nine had lived. He had performed the operation several times on the same women. However, he regretted he had to record that the two very last mothers in whom he had induced premature labour had died from sepsis, which he could not account for. In all the twenty-six cases, embryotomy, or long forceps, had in previous confinements been resorted to. In conclusion, Dr. Moir expressed his horror at the rapid methods which were now adopted, and was confident that if more gradual induction was employed the results would be much more satisfactory.

Specimens were shown by the **President**, Professor **Simpson**, Dr. **Milne Murray**, Dr. **Brewis**, Dr. J. W. **Ballantyne**, Dr. **Johnston**, Johannesburg, and Dr. **Haig Ferguson**.

Dr. A. H. F. **Barbour** read his "Note on Leopold's Description of the Placenta." He referred to Leopold's Atlas as the most valuable contribution to our knowledge of the physiology of pregnancy within recent times, and pointed out that the most valuable drawing was that of a pregnancy nine days after conception, which had never previously been studied. Dr. Barbour then criticised Leopold's theory of the origin of the placenta, and said he did not interpret the appearances exactly as Leopold had done. He discussed the question of how the early ovum was attached to the mucosa and how it was at first nourished, and suggested that Leopold's theory as to the establishment of the blood sinuses and the relation of the maternal to the fœtal blood was not quite satisfactory.

Royal Medical Society.—*5th November.*—Dr. H. S. **Ballantyne** in the chair. Dr. T. A. Ross, Senior President, delivered his presidential address on "Treatment," the study of which, he said, was very apt to be neglected by students, while too much consideration was given to the physical signs, and too little to the symptoms, the latter being the basis of treatment. It was in the smaller details that the good doctor differed from the poor.

Dr. R. D. **Purvis** showed a case of a man, æt. 21, with traumatic hemiplegia of the left side, following operation, which was performed for epileptiform convulsions and severe headaches. The trephine opening was made over the right parieto-frontal region. The headaches and convulsions do not now occur, but his condition is one of complete left hemiplegia.

Mr. **Goodall** described the case of a woman, æt. 28, who suffered from "phlegmasis alba dolens" during the puerperium of her fourth child. Abscess formation occurred.

Mr. CRAWFORD described the case of a woman, æt. 37, who suffered from mitral stenosis complicating labour. Her three previous labours were instrumental. Delivery was effected by dilating the os digitally, under anæsthesia, and applying forceps at the brim.

ROYAL MEDICAL SOCIETY.—12*th November.*—Dr. SCOTT CARMICHAEL in the chair.—The business of this meeting was the delivery of the annual inaugural address by Dr. T. BARLOW of London, on "Infantile Scurvy," which usually occurred during the second period of infancy, from the eighth to the eighteenth month. After premonitory symptoms, the lower limbs become swollen, primarily from the epiphyses of the bones, the joints remaining uninvolved. It is a solid infiltration round the shafts of the bones. A severe symptom which might now appear was a soft crepitus at the epiphyseal junctions. Spontaneous fractures might occur. Swelling of the upper eyelids became evident. Observation of the gums revealed a sponginess, if the teeth were developed, but none if the child had none. The average duration of the disease when untreated was from two to four months. Post-mortem examination revealed the periosteum upraised from the shaft of the bone by blood clots, with hæmorrhages in other parts of the body. The morbid anatomy of this disease was a hæmorrhagic extravasation, especially between the shafts and periosteum, but also into the substance of the bones. The cause of this disease was not bad hygienic conditions. It occurred in the children of the rich and well-to-do; it occurred in children fed on proprietary foods; it never occurred in breast-fed children. By antiscorbutic treatment complete cure could speedily be effected.

GLASGOW PATHOLOGICAL AND CLINICAL SOCIETY. — 8*th November* 1897.—Dr. WALKER DOWNIE showed a man, æt. 56, on whom he had operated for primary epithelioma of the uvula. The uvula was painted with cocaine and removed by scissors. Epithelioma of the uvula is a very rare condition; in fact, only one recorded case can be found.

Dr. HENRY RUTHERFURD showed the tumour (a cylinder-celled carcinoma) in a case of resection of the cæcum, where the symptoms were obscure; also two specimens of intussusception removed by operation. He also read notes of a successful case of intussusception reduced after laparotomy.

Mr. MAYLARD read notes of, and Dr. GALT showed specimens from, a case of carcinoma of the stomach, in which the symptoms due to an extensively infected liver masked those dependent upon the disease in the stomach.

Dr. ROBERT KENNEDY showed a specimen of cavernous angioma, removed by operation from the bend of the elbow.

Specimens and photographs were shown by Dr. SUTHERLAND and Dr. EDINGTON.

FORFARSHIRE MEDICAL ASSOCIATION (held in University College, Dundee).—3*rd December* 1897.—Dr. W. J. WEMYSS in the chair.—

CASES and SPECIMENS were shown by Dr. KYNOCH, Mr. GREIG, and Dr. WHYTE.

Dr. TENNANT BRUCE read notes of a case of bradycardia. The pulse varied from 20 to 34 per minute, and was associated later with convulsions of an epileptiform character. The literature of the subject was reviewed. Dr. Bruce suggested that some confusion existed, due to confounding two distinct conditions—(1) Slow pulse as a symptom of other diseases; (2) slow pulse as a disease itself and dependent on interference with nerve force. Interference in the functional activity of the intrinsic cardiac ganglia was, he thought, the most probable explanation, yet the possibility of a purely medullary origin must not be lost sight of, and he asked whether a lesion in the neighbourhood of the motor nucleus of the vagus, the nucleus ambiguus, might not explain the condition.

Mr. GREIG read notes of two abdominal cases. The first was a case of enterectomy with end to end anastomosis, in strangulated femoral hernia on the right side. The bowel exposed was gangrenous, and perforated by a small irregular laceration; this was excised, and the cut ends of the bowel brought into apposition and sutured. The patient recovered well from the operation, had no pyrexia, and left the infirmary in four weeks, wearing a truss. He considered this operation preferable, although it occupied a little longer time, to the introduction of Murphy's button or bobbins. The second was a case of intra-abdominal strangulation in a stout, healthy boy of 12, admitted with symptoms of acute obstruction. On opening the abdomen, the small and part of the large intestine were distended. There were several enlarged glands, but one larger gland, to which the omentum was adherent, and also an appendix epiploica, which had caused kinking of the bowel. This was divided, and the obstruction relieved. The patient was troublesome and restless, and for this reason required to be dressed daily. The stitches were removed on the tenth day, but were reintroduced under chloroform, because the boy, during a fit of crying, ruptured the cicatrix, and the bowel prolapsed. The case gave no further trouble, and patient was dismissed in due course. Mr. Greig also showed a photograph of a case of recovery, after one year's treatment, from favus of twelve years' duration, the treatment being daily depilation and inunctions with various parasiticides for twelve months.

OBITUARY.

SIR WILLIAM MACKINNON, K.C.B., LL.D.

THE late Director-General of the Army Medical Staff died at his London residence on 28th October, in his sixty-eighth year. A son of the well-known minister of Strath, in Skye, Sir William received his professional education in Glasgow and Edinburgh, and in 1853 was gazetted to the Black Watch, with which gallant corps he passed through the Crimean Campaign. Thereafter he went to India on the staff of Sir Colin Campbell, and served under him during the Indian Mutiny. A few years of peace followed, but during the Maori War he was the principal Medical Officer to Sir Duncan Cameron's force, and for his distinguished services became C.B. He afterwards was in command of the Medical Staff in the Ashanti Campaign. He later held the rank of principal Medical Officer in several garrisons, and for a time was head of a department in the office of the Director-General. He became himself Director-General in 1889, and remained at the head of the staff until 1896. During his term of office he became K.C.B., and Honorary Surgeon to the Queen; while the University of Glasgow conferred on him the degree of LL.D.

Sir William Mackinnon left considerable benefactions, and amongst these is a sum of £2000 to the University of Edinburgh for the advancement of science.

MEDICAL NEWS.

OPENING OF THE M'EWAN HALL.

WITH fitting pageant the great Academic Hall, built for the University by the Member for the Central Division of the city, was handed over to the University Court on 3rd December. As was meet and right, the whole University took part in the proceedings with cordial enthusiasm. The undergraduates inaugurated the festivities, on the previous evening, with a torchlight procession of more than usual splendour, and the ceremonial itself took place in the M'Ewan Hall, in the presence of a representative gathering, which completely filled it. On the platform were the Chancellor (the Right Hon. A. J. Balfour), the Lord Rector (Lord Balfour of Burleigh), the Principal (Sir William Muir), the Lord Justice-General, and Lord Rosebery (both former Lord Rectors), Sir William Turner (representing the trustees), Mr. M'Ewan, M.P., the Lord Provost (the Right Hon. Mitchell Thomson), the Presidents of the Royal Colleges of Physicians and Surgeons (Dr. Tuke and Professor Chiene), and many distinguished guests representing other Universities and learned bodies, amongst whom were Lord Lister and Lord Kelvin, as well as the University Court, the Senatus Academicus, and the Office-bearers of the Students' Representative Council, while the Town Council and the Councils of the Medical Corporations were placed immediately in front. While these various bodies were assembling, Dr. A. L. Peace played some selections on the grand organ.

After the vast audience had sung the Hundredth Psalm, and the Dean of the Faculty of Divinity had offered prayer, Mr. M'Ewan made an interesting statement on behalf of the trustees, and then formally handed over the legal documents, conveying the Hall to the University Court, to the Chancellor. Mr. Balfour, in accepting the gift, remarked in appropriate terms upon the powerful example which the donor's munificent liberality would have, and expressed the opinion that beautiful surroundings exercised valuable effects in the education of youth. The Lord Rector, the Principal, and the Lord Provost having each made a few remarks from his official point of view, Sir William Turner, in moving a vote of thanks to the Chancellor for presiding, gave a very interesting account of the growth of the scheme, pointing out how Mr. M'Ewan had, with unstinting liberality and profound interest, concurred in every step towards the realisation of a great idea. The Dean of the Faculty of Law (Sir Ludovic Grant) thereafter, in an elegant speech, presented Mr. M'Ewan to the Chancellor for the degree of Doctor of Laws, and the time-honoured ceremony was duly performed amidst great enthusiasm. One of the most appropriate parts of the proceedings then followed in the presentation of an address to the donor by the Senior President of the Students' Representative Council (Mr. J. M. Hogge) on behalf of the undergraduates, to which Mr. M'Ewan replied in fitting terms, after which the benediction closed the ceremonial.

POST-GRADUATE COURSE IN MIDWIFERY.

THE physicians in charge of the Glasgow Maternity Hospital have decided to begin a post-graduate course in January. Clinical lectures will be given daily, and the members of the class will attend patients in the outdoor department. Dr. Jardine, 5 Clifton Place, Glasgow, W., will be glad to supply all information as to the course.

ANALYTICAL REPORTS.

CONDENSED MILK, PICNIC BRAND (THE CONDENSED MILK COMPANY OF HOLLAND).

WE have subjected a sample of this condensed milk to analysis, and have found that the specimen submitted to us contained 72·2 per cent. of total solids, and therefore 27·8 per cent. of water at 110° C.

The organic solids consisted of—

Albuminoids	19·4	per cent.
Cane-sugar	21·3	"
Milk-sugar	16·2	"
Fat	9·3	"
Salts	8·5	"
Other solids	16·8	"
	100·0	

On dilution with warm water, a perfect emulsion rapidly formed on agitation. With cold water also a perfect mixture was obtained, but after a longer time. The milk gave no evidence of the presence of starch, and contained no micro-organisms. On standing, a mixture of the milk and water showed a considerable layer of cream on the surface.

The directions given on the tins recommend the addition of fourteen parts of water to one of the milk for newly-born infants, and give seven parts of water to one of milk as the minimum dilution advisable. The first-mentioned dilution, therefore, yields a mixture containing 4·81 per cent. of solids, the second 9·03 per cent., while the percentage of albuminoids is 1·29 and 2·55, of sugar 2·5 and 4·8, and of fats 0·732 and 1·37 respectively.

Diluted with fourteen parts of water, the proportions of the constituents are below the average in woman's milk, but with seven parts of water the proportions obtained approximate very closely to that average, save for the smaller amount of fat, and the substitution of cane-sugar for some of the milk-sugar.

The Picnic Brand Milk has an agreeable taste, and from the results of our analysis is an excellent example of the class of sweetened condensed milk, while the larger proportion of proteid present than in many other kinds should render it more nutritious.

MESSRS. REYNOLDS & BRANSON'S NOVELTIES.

MESSRS. REYNOLDS & BRANSON, of Leeds, have sent us a list of some of their medical and surgical novelties. Several improvements designed to facilitate the administration of enemata and the proper preservation of the syringes are illustrated. The most useful is in the form of a clip which fixes on to the edge of the bowl and round the enema-tube close to the valve, ensuring the maintenance of its position below the surface of the liquid, while acting also as a rest for the nozzle after use. Enema-syringe cupboards and racks are also figured, in which the syringe can be kept stretched out so as to obviate the distortion of the india-rubber when dry.

Among other things we notice a "silent coal-box" for use in sick-rooms, a desideratum often most necessary; and an ingenious vaporiser, at a cost of only one shilling, a night-light protected by wire gauze affording the requisite heat. An ingenious eye-drop flask is also figured, in which solutions can be sterilised *in situ*, a cotton-wool plug serving to arrest the entrance of organisms, after the most approved bacteriological methods.

The catalogue contains figures and descriptions of a number of other devices, all of which appear to be remarkable for their moderate cost.

MONTHLY NOTES
ON METEOROLOGY AND VITAL STATISTICS.

By A. LOCKHART GILLESPIE, M.D., F.R.S.E., F.R.C.P.Ed.,
MEMBER SCOTTISH METEOROLOGICAL SOCIETY.

METEOROLOGICAL MEANS FOR THE EAST OF SCOTLAND DISTRICT, FOR THE FOUR WEEKS ENDING NOVEMBER 27, AND FOR THE YEAR FROM JANUARY 3.

	Temperature.			Rainfall in Inches.		Sunshine. Hours.		Mean Daily Variability of Temperature.
	Mean.	Accumulated Day-Degrees.		Actual.	Accumulated from Jan. 3.	Actual.	Accumulated from Jan. 3.	
		Above 42°.	Below 42°.					
Mean	40°·9	*[1] 90° [2] 2329°	71° 678°	3·15	28·8	49·0	1246·9	3°·1
Observed	45°·05	[1] 130° [2] 2376°	29° 725°	1·60	25·7	33·0	1316·0	2°·82
Difference	+4°·15	[1] +40° [2] +47°	−42° +47°	−1·55	−3·1	−16·0	+69·1	−0°·28

VITAL STATISTICS.

MORTALITY IN FOUR LARGE TOWNS IN THE EAST OF SCOTLAND, DURING NOVEMBER, AND SINCE JANUARY 1. Actual Numbers and Rate per 10,000 per annum.

	Total.		Constitutional Diseases.		Circulatory System.		Nervous System.		Respiratory System.	
	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.
Deaths expected and Mean Rate for 1891–1895	[1] 1,237 [2] 12,021	222·0 196·0	199 2275	35·7 37·1	102 1100	18·3 17·9	122 2194	22·0 35·7	317 1579	57·0 25·7
Actual Deaths and Rate per 10,000	[1] 1,053 [2] 12,472	188·9 203·4	201 2451	36·0 39·9	91 1150	16·4 18·7	106 2215	19·1 36·1	241 1506	43·2 24·5
Difference from Mean	[1] −184 [2] +451	−33·1 + 7·4	+ 2 +176	+0·3 +2·8	−11 +50	−1·9 +0·8	−16 +21	−2·9 +0·4	−76 −73	−13·8 − 1·2

	Digestive System.		Urinary System.		Pneumonia.		Phthisis.		Cancer.	
	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.
Deaths expected and Mean Rate for 1891–1895	[1] 71 [2] 794	12·7 12·9	31 314	5·5 5·1	99 863	17·8 14·0	96 1137	17·3 18·5	48 509	8·6 8·3
Actual Deaths and Rate per 10,000	[1] 75 [2] 872	13·5 14·2	31 335	5·5 5·4	91 1000	16·0 16·3	93 1251	16·7 20·4	46 563	8·3 9·0
Difference from Mean	[1] + 4 [2] +78	+0·8 +1·3	+0 +21	+0·0 +0·3	−8 +137	−1·8 +2·3	−3 +114	−0·6 +1·9	−2 +54	−0·3 +0·7

* NOTE.—The figures [1] denotes the data for November, [2] for year to date.

November was warmer than any November in Scotland for many years, warmer than any since meteorological records have been kept. It was also dry, but with diminished sunshine and a variability of temperature rather less than the normal. As the last three days of the month are not included, the data given above are higher than those for the whole month, these days being much colder, wet, and stormy.

The meteorological figures for the elements discussed from 3rd January to date show a correspondence between the excess of temperature in day-degrees above 42° with those for that below 42°. The rainfall is more than 10 per cent. below, the hours of sunshine 5 per cent. above, the average.

The mortality during November was much below the average for the month, the deficit being equal to 14·8 per cent. of the number expected. Deaths from diseases of the respiratory system were especially less numerous than usual, while fatal cases of pneumonia were fewer than expected for the first time since the month of April. A very slight excess over the average number of deaths was noted under constitutional and digestive diseases. Influenza caused nine deaths.

The data for the year have been altered in no slight manner from those given for October, the rate per 10,000 showing an excess of 7·4 over the normal, in place of the previous 11·4. Under every heading, save under constitutional and digestive disorders, the average rate is lower, while the small excess chronicled under the respiratory system at the end of October has been converted into a very considerable deficit. If the figures for pneumonia be deducted, deaths from other pulmonary diseases, excluding phthisis, are almost 30 per cent. below the normal for the eleven months, while including phthisis they are still 5 per cent. below it.

Thus in November, which was characterised by very unusual warmth, a scanty rainfall, deficient sunshine, and a smaller change of temperature from day to day than is usual, the number of deaths was much below the average, only those from constitutional and digestive diseases being slightly in excess.

The number of deaths since the beginning of the year, with a practically normal temperature, a deficient rainfall, and excess of bright sunshine, has been larger than was expected, with a notable decrease in the number due to respiratory diseases.

EDINBURGH
MEDICAL JOURNAL.

ORIGINAL COMMUNICATIONS.

PES PLANUS AND PES CAVUS: AN ANATOMICAL AND CLINICAL STUDY.

By RICHARD BARWELL, F.R.C.S., *Consulting Surgeon, Charing Cross Hospital, London.*

ALTHOUGH much has been written, both in recent and older dates, concerning deformities of the foot, yet certain by no means unimportant points seem to me to have been insufficiently appreciated or overlooked, especially in regard to the action of some muscles upon bones other than those into which they are directly inserted, and to the effect of combination of their correlated or antagonistic powers. No attempt need be made in the few pages at my disposal to describe the well-known anatomy of the foot; those points only which are important to the subject require mention, and for the present only pes planus and pes cavus will be discussed.

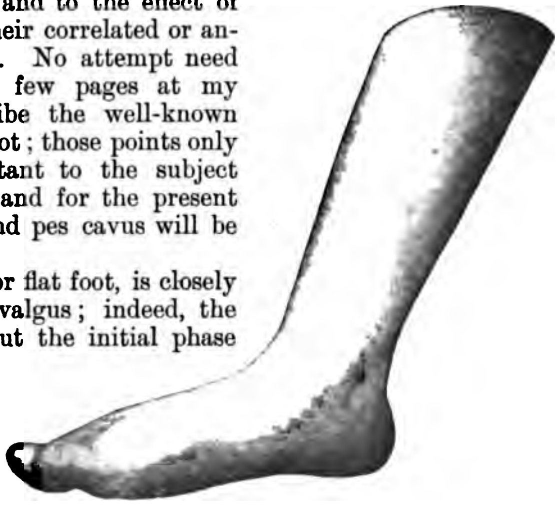

FIG. 1.—Flat foot, moderate severity.

PES PLANUS, or flat foot, is closely allied to talipes valgus; indeed, the former is often but the initial phase of the latter, and one may trace, in an occasional untreated case, how the one malformity gradually develops into the other; the boundary line between the two is somewhat broad and vague. As long as the outline of the external border of the foot is convex, or even straight, I have been accustomed to call the condition "flat foot," but when the anterior forms with the posterior half a distinct entering angle, to name it "valgus." The leading osseous faults in flat foot are positional; first, the tarsus, and consequently also the metatarsus, roll over or are rotated outwards, so that they come to the ground in severe cases, not by the proper lower, but by a portion of the inner, surfaces, or at least by the edge separating these two aspects; secondly, those bones follow on each other in a straight or nearly straight line, the normal curve of the inner pedal border being lost. These abnormal positions produce certain changes in the external shape of the foot, which, being well known, hardly need very much description; they are well depicted in the annexed figure (Fig. 1), in which the points chiefly to be noted are the straight line formed by the inner border of the sole, the exaggerated backward projection of heel, the increased length of the extremity and effacement of instep, small protuberance of the inner malleolus,[1] and the marked protrusion of the tarsal bones below and in front of that process.

The muscles which keep up the longitudinal arch on the inner border of the foot are very many. Omitting for the present those in the sole, which act rather as sentient and elastic tie-beams, there are four arising in the leg whose action are essential as supports.[2] They are the anterior and posterior tibials, the peroneus longus, and the flexor longus hallucis. It is more especially to the two last that the opening sentence of this paper refers, for it must be noted that every one of the five bones that build up the arch at the inner border of the foot has inserted into it, or is strongly influenced by, one or other of these muscles. Thus the head of the astragalus and the anterior end of the os calcis (the crown of the pedal arch) are kept up by the flexor longus hallucis, acting through the medium of the sustentaculum tali; the same action, by raising the front of the heel bone, aids in keeping down its hinder end (the back buttress of the arch) firmly on the floor. The scaphoid is supported by the posterior tibial, the internal cuneiform and base of the first metatarsal by the anterior tibial, while the head of that bone, the front buttress of the arch, is kept down by the peroneus longus. In a recent work by Messrs. Walsham and Hughes, these actions of the long peroneal and flexor muscles are denied in the former case, chiefly because not "any reason has been assigned for such weakness." The reasoning is peculiar, inasmuch as the effect of weakness cannot be denied because its cause is occult. In the latter case, because the valgous position of the great toe is

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[1] In the earliest stages of flat foot, while outward rotation is still but slight, the internal malleolus is unduly prominent, especially when looked at from behind, but in further phases it becomes more and more concealed by and involved in the abnormal projection of astragalus and scaphoid.

[2] Mention need not at the present moment be made of ligaments and fasciæ; they are adjuvants to the muscles, and when these are paralysed or weakened, such passive structures invariably, however slowly, stretch and yield.

'sufficient to deprive the arch of the foot of the support which it normally receives from this tendon."[1] Flat foot, however, frequently occurs without valgous toe, or, what is quite as common, that outward trend of the toe is a sequela of the foot distortion. Again, such valgous condition, without any flat foot at all, is, at the present day, since people will wear pointed shoes, a very frequent deformity, much more so than flatness of foot; and the special influence of the long flexor, to be now described, in keeping up the arch is not at all affected by the position of the toe.

The power of the long flexor, to which I thus allude, is something beyond the mere bowstring or tie-beam-like action of that part which lies in the sole. Before coming into that region, the tendon is deflected at very little more than a right angle round the lower surface of the lesser process of the os calcis, which, underlying the head of the astragalus, is also called the sustentaculum tali. It projects horizontally inwards from the body of that bone in an outrigger-like manner, as shown in the annexed figure (Fig. 2). Let it be observed how very far it lies beyond the line of gravity of the os calcis as a whole—so far, indeed, that the bone cannot even support itself, but by that projection is so overweighted towards the inner side, that, if placed upright on the table, it falls over in that direction. Much less can it then, without extraneous aid, support the astragalus, especially when, in the erect posture, the body weight falls upon that bone. This aid is supplied by the flexor longus hallucis, which is the real sustainer or sustentaculum tali, and which prevents that bone and the os calcis rolling over to the inner side.

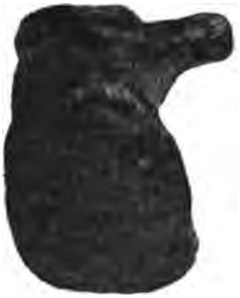

FIG. 2.—The os calcis from behind.

It is strange how this particular and very important action of the long flexor has been entirely overlooked by writers on deformities of the foot—not one, as far as I know, has mentioned it; and yet the form of flat feet in nature, or as shown in many plates, and a representation of the skeleton of flat foot given in a recent work,[2] very clearly indicate that this and not the causes given is the true cause of the malposition of the bones.[3]

I would not, however, be understood as affirming that every case of flat foot originates in paresis of the flexor longus, singly and alone, nor indeed of any one isolated muscle. A great number are the result of general weakness, or, to what comes to much the same thing, of the assumption of tasks greater than the muscular strength is able to perform; such, for instance, as being made to stand or walk too early in infancy, or a little later in life being allowed or compelled to stand and walk for many consecutive hours, or to carry heavy burdens. In this class must also be included the large number of young people who suffer debility from too rapid growth, especially when, as frequently in girls, this is combined with excessive and prolonged menstruation; also the cases that arise on getting about again after long confinement to bed with some debilitating fever, rheumatic or otherwise. Still, even in these the long flexor is that which first yields, for be it remembered the whole weight of the body is supported by the astragalus; and that which upholds that bone, and with it the crown of the plantar arch, is this oft-named muscle. Besides this condition, namely, general weakness, are a quantity of local causes. Paresis of a muscle (which itself may be the result of infantile paralysis only partially recovered from), a faulty posture, a half voluntary trick of the patient frequently originating in pain, such as accompanies corns, bunions, especially ingrowing nail, or very commonly improper foot gear. However induced, this weakness, or habitual throwing out of gear of one particular muscle, imposes upon the one nearest to it in function extra work. This one is mechanically less well placed; it therefore is an inefficient substitute, only at the expense of over-exertion. It soon therefore becomes stretched and weak; so on to the next and the next; for no muscle or set of muscles can properly undertake the work of a lost one. Thus each in turn becoming inefficient, the muscles and ligaments of the sole are called upon, which also very soon elongate. So in an old-standing flat foot we find but little clue to the original muscle affected, though in earlier cases some lead may be found. Here is shown a case I came across some years ago of pes planus, from loss of power of the long flexor, followed in all probability by a like but less marked defect of the posterior tibial muscle; the case also serves to show what has just been insisted on, namely, the attempt on the part of other muscles to take up the abandoned work of a weakened one, for here the anterior tibial is evidently working hard but ineffectually to support the arch. This effort ceased eight days after I saw the patient, while flatness of the foot became more marked, and was successfully treated, the condition being recent, with unusually rapid result.

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[1] "Deformities of the Human Foot," p. 406.

[2] Walsham and Hughes, p. 417, Fig. 254 *f.*

[3] It is true that a paper by Mr. Ellis, published in this year's volume of the *Medico-Chirurgical Transactions*, mentions this muscle as one of the upholders of the pedal arch, but simply as a tie-beam in the sole; not a word is said of its action on the lesser process of the os calcis and on the astragalus. I must repeat here what I said with more detail at that meeting of the Society, that the author was much misled by several false analogies, and by the behaviour of an imperfectly constructed model (*Med.-Chir. Proceedings*, London, 3rd series, vol. ix.).

The pain of flat foot is singularly variable, both as to its amount and locality; indeed, many in whom the deformity began in early excess of walking, as also rickety cases, suffer no pain at all, until the deformity is very far advanced, when compression of soft parts between the scaphoid or cuneiform and the ground is often productive of considerable suffering. By different persons, and by the same person at different stages of the deformity, pain is located at very various portions of the foot. I do not propose to discuss them all on the present occasion, although it would be well to mention a certain very definite and often very acute pain, that in the earlier phases of an increasing malformity is in many cases felt on the dorsum, a little below and in front of the external malleolus. The pain, though severe, is vague in character, and is usually relieved temporarily by pressure, as also by another means to be mentioned immediately. The locality corresponds to the orifice of the sinus tarsi, and my observations lead me to believe that it is produced by stretching of the outer part of the calcaneo-astragaloid interosseous ligament, consequent on the displacement of those bones that follows on drooping of the sustentaculum.

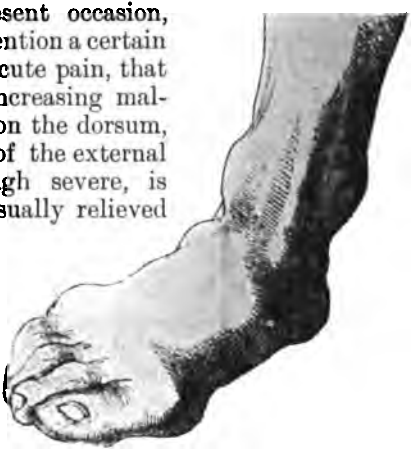

FIG. 3.—Flat foot, early stage.

The treatment of flat foot should be primarily directed to aid those muscles, and especially the great toe flexor, in keeping up the pedal arch, but the means must be adapted to, and commensurate with, the severity of the case. A commencing deviation, such as amounts only to a certain pronation of the extremity, can very generally be cured with facility. The general condition of body must, of course, be taken into account—anæmia, inertia, excessive or prolonged menstruation, dealt with; prolonged standing or walking forbidden. The foot-gear must then be so arranged as to counteract tendency to pronation. On examining a boot or shoe which the patient has worn for some little time, the surgeon will find all the inner margin of the sole[1] very much worn, save as a rule under the great distal toe, perhaps even the upper leather along the whole inner margin. This, while it indicates how falsely the patient treads, namely, on the inner instead of on the external border of the foot, is also detrimental, as the leather, becoming by this wear thinner on the inner side, favours still further the faulty position. The lesson to be derived from such experience is, to reverse this and make the sole thicker on the inner margin, not by a strip of leather running the whole length of the boot, for that is clumsy and heavy; neither by what is worse, a sole inside the upper, also along the whole length, because that also is heavy, and requires a more capacious boot than patients need or like to wear, because the sole, the usual outer one, wears the more quickly, which very soon annuls the desired advantage, and because it fails to give the hallux a certain remedial play. I am accustomed to hand to my patients an explanatory diagram with the following directions, which they can give to their shoemaker:—"Fasten with brads to inner half of heel a wedge of leather, $\frac{5}{16}$ in. thick on border, and sloping to nothing a little beyond middle, and fasten under ball of great toe a half round of leather, $\frac{1}{4}$ in. thick at middle of margin, and sloping to nothing all round." The dimensions are for full-grown persons, for children the thickness is less. The advantages of this method are, that the weight of the boot is hardly increased, and the additions are, while it is being worn, barely perceptible; as soon as they begin to get thinner they can be replaced, at the cost of a few pence. The half round of leather does not come to, or near, the front end of the boot, and thus the great toe has to bend over a little to get its bearing on the floor. Another benefit is this—when the patient treads on the inner border of the foot, every step tends to abduct both posterior and anterior tarsus by the pressure of body weight; but if, by means of these wedges, he be forced to tread on the outer border, that same force adducts the one-half of the tarsus on the other. I have, by this simple contrivance, cured many commencing flat feet. The pain below the outer malleolus often disappears at once. That under the sole only a little more slowly. Usually, and certainly in rather more advanced cases, the evening, and indeed also the bedroom, slippers should be provided with similar but rather thinner wedges. The object is to prevent weight and position elongating the muscles; and in marked cases, especially in young subjects, this should continue during the night. The foot should, by sufficient but not painful manual pressure, be bent and rotated inward, so as fully to restore the arch, and to its outer side a poroplastic splint be moulded, so cut as to embrace two-thirds of the leg (in circumference), about one-third of the dorsum, while it underlies nearly all the sole of the foot; a splint so made can be worn at night without discomfort, and in the morning opened up a little to allow of easy removal. It will, indeed, remain on without external aid, but it is better to further secure it by a $1\frac{1}{2}$-in. wide webbing strap in figure-eight form.

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[1] Shoemakers in their vernacular call only the front part sole, the back part heel; this distinction is not adopted here, and by the word "sole" I mean, unless specially indicated, the whole part on which the person treads.

In connection with this part of the subject, I may warn my readers against allowing any patient to wear "valgus pads," that is to say, a partial inner sole of metal, so constructed as to underlie the arch, and curved so as to be higher on its inner side. It aims at pressing up the arch from below, and if the foot were made of insensitive brick or stone-work might succeed; but as the sole of the foot is a living structure, the pressure falls, first, on the plantar fascia and on the muscles (important tie-beams), and stretches and softens them, then upon the largest nerve of the sole, the internal plantar, and induces often pain and always want of power. During the time that the pad is there, the sole is forcibly made concave, but on its removal flatness is worse than before.

Besides the positional arrangements for permitting the foot muscles to shorten themselves, or perhaps, I should rather say, for preventing them from becoming lengthened, the surgeon should prescribe exercises devised to strengthen them, more especially the long flexor of the great toe. Unfortunately this muscle is so deeply placed in leg and foot that to apply faradisation is impossible. The electric studies of its action that Duchenne and I also have instituted had all to be made on recently amputated limbs. Duchenne, as far as I can see by his writings, only observed its action on the great toe. My own work exhibited another. The muscle thus galvanised rotates the foot inward, and increases the arch by raising the crown, and at the same time shortens commensurately the foot. These actions are the more perceptible the more the extremity has been previously rotated outward, and if the ultimate phalanx of the great toe be, by manual force, prevented from bending. The exercises called "tip-toe" by Mr. Ellis, consist of regular and rhythmical rising on the toe and falling back on the heel; they are useful, if they be carefully watched, and if one can make sure that the patient really uses the toe-flexor and not merely the calf muscles. This is impossible to one whose big toe is markedly valgous.[1] Thus, although I do not reject the tip-toe exercise altogether, I prefer, and lay more stress on, the following:—Several times a day the patient is to stand upright with the knees straight, and the feet parallel to each other, or better with the toes turned a little in, and then rotate the foot inward, so as to stand for a few minutes on their outer border; afterwards, place the foot square on the floor again, and repeat the manœuvre several times until the foot is tired. At first, and until sufficient strength is gained, the other foot on the floor is to support some of the body-weight, but after a time only the affected limb is to rest on the ground, while balance may be secured by placing the hand of the same side on the wall, or on some piece of furniture. When both feet are flat, the inward rotation may be done with the two simultaneously, afterwards with one at a time. In sitting, the feet are never to be placed flat on the floor, but should be allowed to rest on the outer border. By these means flat feet, while they are still in a stage that permits restoration of the arch and movement by moderate manual pressure, can gradually, though not very quickly, be cured, and the cure is a sound physiological one; yet, to avoid tendency to relapse, it is well that the patient wear the wedge-shaped soles for some time after even complete restoration to normal shape.

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[1] I do not intend to discuss here the method I use for overcoming hallux valgus.

Certain other cases require more stringent treatment. They are of two sorts—(1) Those in which the sole is not merely flat, but even has the inner margin somewhat convex, yet the tarsus and metatarsal bones movable on each other, the ankle almost completely free. (2) Those which combine, with very marked flatness, such fixity of the foot bones that even very considerable force hardly moves them on each other; the ankle-joint itself is very stiff, and the range of its mobility quite small. Both these classes of case are generally more or less valgous. In both the indication of treatment is forcibly to restore the arch, together with a somewhat exaggerated inward rotation, and to keep the extremity in that posture for some weeks—the former uninterruptedly, or with, at the end of a fortnight, one interval of a few days, during which rubbing and passive movement may be freely used, while between each sitting a poroplastic splint, cut and moulded as above described, is to be worn. During this interval the patient should not be allowed to stand, and after two or three days the plaster should be reapplied, and in severe cases a month of such splintage will be necessary, and in the worst forms, even six weeks. In the latter class of the malformity there will surely be more difficulty in restoring the arch, and in getting sufficient inward rotation. The plaster must be put on in the same way, but its removal and reapplication is to be rather more frequent, and the massage must in those intervals be somewhat vigorous. In both cases, and before giving the patient perfect liberty, the last plaster case should be provided with a rather high heel, made of several layers of thick felt, kept in place, before the plaster bandage is put on, by the cotton-wool roller. In this splint he may walk about.

We have yet to consider the mode of restoring the arch and rotating the foot, previous to applying the plaster. Those which yield with difficulty or not at all can only be rectified either under an anæsthetic or after from half to three-quarters of an hour steeping in the dry hot-air bath—a device which renders, in many cases, both muscles and ligaments very limp, so that I have frequently been able to form a good arch and high instep by the use of very little power. But cases of complete stiffness usually require general anæsthesia. There are even some, though very few cases, which cannot be completely rectified at one sitting. If a second attempt be necessary, only the hot-air bath and but little force is required. As a very general rule, no tendon or fascia should be cut, yet exceptional cases occur in which, on any attempt at inward rotation, the four outer toes become forcibly extended; in such, division of the long extensor tendons may be, though with reluctance, undertaken, when the peroneus tertius should also be severed through the same puncture. Only rarely does the peroneus brevis require division, and only when the outer border of the foot exhibits a well-marked entering angle, with much tendency to increase. The long peroneal tendon should only be touched in quite exceptional cases, when the front part of the foot, especially the cuneiform and the metatarsal bones, are much more rotated outwards than the parts lying behind them. When the unfortunate necessity for this division arises, care must be taken, in applying the plaster bandage, to very considerably depress the head of the first metatarsal bone.

Flat foot is so common, and therefore so important a malformity, that my remarks, especially on its treatment, have occupied a large proportion of my space; I must therefore curtail certain things which I wish to say concerning the opposite deformity—Pes Cavus. The name indicates considerable exaggeration in the arch of the foot; but this symptom is in reality only a crude method of classing, under one nomenclature, several widely different conditions, each of which will be as shortly and succinctly as possible reviewed. By far the most usual form of pes cavus is due to a certain amount of weakness, or to undue length of the calf muscles, producing a downward droop of the heel-bone, sufficiently slight, in most of these cases, to escape notice without close study; in other words, the deformity is a species of calcaneus. Talipes calcaneus has two forms—the one in which not only the surals, but also the deeper muscles at the back of the leg, are paralysed, in consequence of which the os calcis so falls that its long axis is a continuation onward of the line of the tibia, and the foot in front of the midtarsal joint projects forward from the lower end of the leg horizontally and parallel to the floor. In the form in which the surals are partially or entirely paralysed, while the deep muscles retain their power, the heel takes the same vertical position, but the deep still valid muscles draw down the front half of the foot until the heads of the metatarsal bones come to the ground. Here subjoined is an illustration (Fig. 4) of a severe case of this description; the hollow of the foot, and the way that the anterior tarsal bones form with the posterior an acute angle, is well seen.[1] The deformity, the result of infantile paralysis, is unusual, in its great severity exaggerated, but most cases of pes cavus show a certain loss of power in the surals and some amount of drooping[2] of the

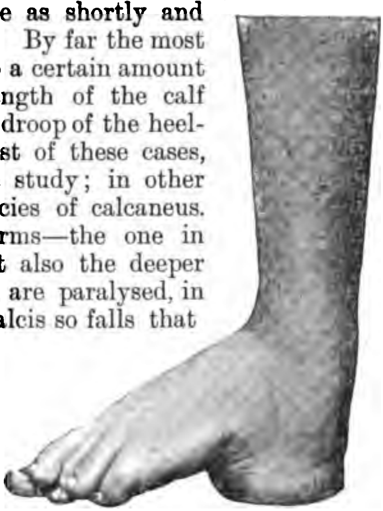

Fig. 4.—Pes calcaneo-cavus.

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[1] A skiagram, showing the bones of this foot, was published in the *Lancet*, London, about a year ago; the os calcis and astragalus ran from the junction with the tibia downwards and forwards.

[2] The word "droop" is not intended to mean a merely passive fall; the de-

heel, as proved by its want of posterior projection, the back outline of the lower part of the leg as seen from the side being too straight. This droop is sufficient to place the heel on an abnormally low level, the point rather than the lower surface coming to the ground. Therefore, to procure firm station, the patient seeks an additional point of support, by instinctively bending down the anterior tarsus. This bend is present at the medio-tarsal joint, but because the anterior end of the os calcis and the head of the astragalus are much raised, it is less easily perceptible than the bend of the cuneiforms, cuboid, and metatarsals. This form of cavus is well seen in the annexed figure (Fig. 4); the straight line at back of the leg from the level of the malleolus downward, and the outline of the plantar surface of the posterior half of the tarsus ascending too steeply from the point of the heel to the bend of the tarsus, show the downward droop of the os calcis. The position of the toes will be explained immediately.

Duchenne in 1867,[1] and following him Mr. Golding Bird,[2] ascribed pes cavus to paralysis of the interossei and lumbricales, the former comparing it with the claw hand which undoubtedly results from that defect; but *main en griffe* very rapidly exhibits deep excavations between the metacarpal bones and the extensor tendons, so that its dorsum comes to resemble a dissected extremity covered by a thin tissue. Such condition is hardly ever seen in claw foot. Faradisation shows only in very rare cases paralysis of the muscles in question. Pes cavus so produced is, I am sure, rare.

A third class of pes cavus is due to spastic tension of the long peroneal muscle. Though I cannot determine the cause of such contraction, I have more than once detected its presence.

When from any one of these causes the normal distance between the tubercles of the os calcis and the heads of the metatarsi has been diminished, the plantar fascia, the muscles, and the ligaments in the plantar aspect become contractured, *i.e.* the tie-beams of the arch become too short; and bend its buttresses too closely together. Also, the sharp bend of the instep puts the extensor tendons on the stretch (hence dorsal flexion of the first phalanges),[3] which in its turn tightens the flexor tendons, causing plantar flexion of the distal ones.

The outcome of the paresis and contractures is, that, by the former, shortening of the distance between the buttresses is produced, and by the latter their fixation in that abnormal posture. Hence the first indication for treatment must be to lengthen the tie-beams in the sole, and this can only be done by section. No

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pression is also due in the early stage to the unopposed action on the sustentaculum tali of the flexor longus hallucis, and the tonicity of the plantar muscles, later to contracture of those parts and of the plantar fascia.

[1] "Physiologie des mouvements," p. 528.

[2] *Guy's Hosp. Rep.*, London, 1883.

[3] The pristine relaxation of the plantar fascia before its contracture commences, abets this position of the phalanges.

advantage is gained, and certain after troubles are incurred, by doing this through an open wound. I am also opposed to severing all structures, including arteries and nerves, down to the bones; nevertheless the section must be pretty extensive. When the surgeon examines the sole, while his assistant tries to strengthen the arch, he will feel the plantar fascia tight, more especially along its inner portion; and lying a little deeper, but plainly perceptible, is the long flexor of the toe. Passing a tenotome about the level of the carpo-metatarsal joint above that tendon, he divides all structures towards the skin. Before withdrawing the instrument, he should seek for other bands and sever what resists, the adductor hallucis especially being divided. He will not, however, be able to rectify the position; although no tight band is perceptible to the finger, the resistance is due to the ligaments, especially to the short and long plantar ones; these can be attached without wounding the artery or nerve, by passing a strong tenotome from either side of the foot, between those structures and the bone, and cutting with exercise of a little force towards the latter. If the toes be dorsiflexed their extensors may be divided, but they often yield with crackling to pressure. It is very often desirable to cut the tendon of the peroneus longus, even though that muscle may not be primarily in fault. This necessity may be partly judged by eliciting if that muscle be much subject to cramp, but chiefly by its behaviour on the side of the foot during inward rotation. The section should never be made behind the malleolus.

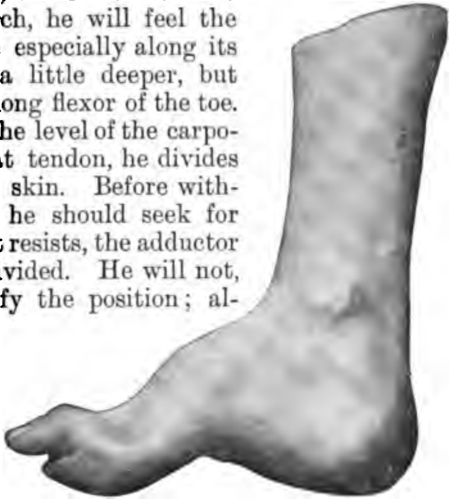

FIG. 5.—A slighter case of pes calcaneo-cavus.

The operation being completed, the foot is put up as straight as possible in plaster of Paris with a heel, but even then the foot is not as straight as it may afterwards be made. Complete restoration of form can indeed rarely be at once effected; the arch and instep still remaining rather high, and the foot somewhat short. In such circumstances I have found the hot dry air bath exceedingly efficacious. It should be used from two to five weeks after the operation, the foot being immersed not less than half an hour. The chief object and the main difficulty in applying the plaster bandage is to keep the first metatarsal bone well extended (dorsally), which cannot be effected merely by the figure-eight turns of the roller; but an addition, as follows, answers well. Before hardening has occurred, a sufficiently thick pad of felt is placed under the ball of the great toe, and the surgeon, unwinding some two feet of plaster-filled bandage, places its centre under the pad and head of the first metatarsal; then, while an assistant presses the bone well into place, he draws the bit of bandage tight, crosses it on the dorsum, and brings the end round behind the ankle, repeating the procedure with another strip, and even, if necessary, with a third, taking care that each piece adheres firmly to the already applied bandage. This part of the sole may then be protected with a piece of paper, a stirrup-like loop of bandage passed under it, and the patient directed to pull on it as hard as he can until the plaster is set. When in due course this splintage may be abandoned, the patient, supposing he suffered from calcaneocavus (the commonest form), should wear *inside* the boot a false heel, while massage properly and sedulously applied will complete the cure. That is to say, the patient will be able to walk perfectly well and without limp, even though the foot, owing to previous malnutrition, may remain a little short.

ON THE RELATION OF THE NERVOUS SYSTEM TO DISEASE AND DISORDER OF THE VISCERA:

The Anatomy and Physiology of the Nervous Mechanism of the Viscera.[1]

By ALEXANDER MORISON, M.D. (Edin.), F.R.C.P.Ed.

(PLATES I., II., AND III.)

WHEN the Council expressed to me the desire of the College that I should deliver the Morison Lectures in 1897 and 1898, I need not assure you that I was as much surprised as gratified by the unexpected honour you had done me. My first impulse was, respectfully to decline your proffered kindness, and the more so because an honorarium is attached to the lectureship, the appointment to which has, in consequence of the agreement of the College with the founder, lain in my hands.

On reflection, however, I conceived that the monetary difficulty might be capable of arrangement, and felt that the privilege of addressing you, which your indulgence proposed to confer upon me, was not to be declined without serious consideration. For having rendered it possible for me to accept the office, I beg to offer you my thanks.

I am well aware that my own position and attainments were little worthy of your consideration. My gratification, nevertheless, in addressing you from this place, rests upon the double ground of my fellowship of the College, and my kinship with the founder of the lectureship.

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[1] The Morison Lectures, delivered before the Royal College of Physicians, Edinburgh.

The continuous or perpetuated consciousness or *esprit de corps* which pervades and actuates large and important bodies of men, like the Royal College of Physicians, influences likewise the smaller and humbler human aggregate of the family. It is therefore, as I have said, doubly pleasing to me to have the opportunity of offering, in my own generation, filial homage to the memory of my grandfather, in this hall, to which he was ever warmly attached, and before this company, among whom, had he been alive, he would have rejoiced to have seen me numbered, and to be numbered among whom I regard as the chief honour of my professional life.

When I remember the distinguished names which have been associated with the lectureship—the names of Dr. William Sellar, of Sir Arthur Mitchell, of Drs. Clouston, Batty Tuke, and Sibbald, of Professors Gairdner and Hamilton, and of Drs. Keiller and Alexander Bruce, I am even now appalled at my temerity in having accepted the post, and crave your indulgence should my efforts fall short of the standard of excellence established by them.

The subject-matter for my lectures presented another difficulty. A large proportion of those delivered have dealt with mental disturbances of the brain from the alienist's point of view, and to special knowledge in this sphere I could lay no claim. A smaller proportion, however, were concerned with the nervous system from the point of view of the anatomist, the pathologist, and the general physician; and it was with the latter that I felt I could most appropriately associate myself.

My attention had for some time been directed to the relations of the nervous system to disease and disorder in the viscera, partly on account of the admitted obscurity of the subject, and partly because of the frequent opportunities presented to me in hospital and private practice of examining cases in which that relation seemed, while obscure, to be nevertheless indubitable. I concluded, therefore, that this subject would be worthy of more systematic examination, and might have some interest for others as well as myself.

As the honorary secretary of the College was good enough to convey to me your wish that I should deliver the lectures for 1897 and 1898, I determined to deal with the matter in its more purely scientific aspects this year, namely, in its anatomical and physiological aspects, as distinguished from the bearing of these fundamental considerations upon the pathology and clinical phenomena manifested by disease and disorder of visceral innervation, which I propose treating in the next series.

It would be impossible, in the time at my disposal, to enter with detail into the neural anatomy and physiology of all the viscera, and were it possible it would be tedious to do so. I shall therefore endeavour to study the matter on representative lines, so as to elucidate, however dimly, those principles which guide us in the rational discovery and treatment of disease affecting the organs which we conventionally term viscera, although it might be legitimately argued that the whole organism is but a complex viscus.

Before examining the anatomical relations of nerves to viscera, however, it may be of interest, and not unprofitable, to refer shortly to the *methods* suitable for their detection and examination.

The essentials of vision are visual power on the part of the instrument of sight, and visibility of the object looked at. The earlier microscopists trusted chiefly to the translucency of the object and the power of the microscope to discover detail; and when we look at the beautiful delineations of detail in works such as those of Lionel Beale, delineations in some instances representing an enlargement of 1800 diameters, we recognise what excellent work was done before the era of modern methods. The endeavour of the modern microscopist is, by staining methods of various kinds, to render the object examined more visible—a circumstance which naturally renders the use of the higher powers of the microscope less necessary.

For the examination of detail, central and peripheral, in the nervous system, the use by Camillo Golgi in 1880–81, and by Santiago Ramon y Cajal in 1889, of the chrome-silver method, has caused a revolution in our conceptions of the ultimate nervous system, a revolution which has been powerfully promoted by the adhesion to that method of, and his own researches by its means into the minute anatomy of the nervous system, by Albert von Kölliker, the revered *doyen* of European histologists, to whom some of us can offer the homage of pupils to their master.

The Golgi-Cajal method is, however, notwithstanding its indubitable value, not an easy method of examination, and this, by their own confession, even in the hands of some who are justly acknowledged to be experienced and trustworthy histologists. My own experience of the method in the examination of nerve-endings in viscera was disheartening in the extreme, and for such results as I have obtained I had to betake myself to another method which I shall mention presently. I was convinced, however, that the fault lay with me, not with the method, in my failure, and I determined to betake myself to my old teacher, Geheimrath Albert von Kölliker, for information, as I saw from the last edition of his "Gewebelehre" that he had employed it very successfully. The result of my visit to Würzburg I have pleasure in stating here, as I believe it may save others much disappointment and loss of time, and save, likewise, this invaluable method from the aspersions of the unsuccessful. I had an opportunity of examining many specimens of the central and peripheral nervous systems with Herr G. Peter Hofmann, the curator of Professor Kölliker's museum, who made all or most of the preparations which illustrate the last edition of the "Gewebelehre," and saw for the first time the perfection to which the Golgi-Cajal method could be brought.

The method pursued by Herr Hofmann, under Professor Kölliker's supervision, is not essentially novel, but some points which have at times been lost sight of are emphasised and rigorously adhered to.

The tissue to be examined must be fresh—*lebend warm*—and when cut in moderately thin sections, placed at once in the osmic acid and bichromate of potash solution, without previous hardening in Müller's fluid. The mixture consists of a 1 per cent. solution of osmic acid and a 3 per cent. solution of bichromate of potash in distilled water, in the proportions of one of the former to four of the latter. The tissue is left in this mixture at a temperature of 30° to 33° C. for three days, and shaken from time to time, to prevent the deposit of precipitate upon it, a manœuvre which appears to contribute to the remarkable clearness of the Würzburg preparations; thereafter, it is transferred directly to a ·75 per cent. solution of nitrate of silver in distilled water for at least two days, and it may be allowed to remain in this solution for any length of time, that is, until used in the next step in the method. On being first placed in the silver solution, there is, of course, a precipitate, which necessitates its transference in half an hour to fresh solution, in which it may remain without further changing. It is when the tissue is removed from the silver solution for further treatment that the necessity for care, and especially for promptness of action, arises. Upon this the result, satisfactory or otherwise, seems mainly to depend. It should be placed for one hour in absolute alcohol. Then for half an hour in thin celloidin, followed by an immersion of a few minutes only (two or three) in thick celloidin, and mounted for section. The celloidin block should then be placed in 70 per cent. alcohol till hardened, a process which takes from one to three hours. Sections should be made, however, within an hour of embedding, if possible, and the preparations mounted without a cover-glass. Herr Hofmann informed me that he had found a longer postponement of section-cutting involved a loss of fine detail, and that this was also the case if good preparations were mounted under glass, without having previously been fixed by hydrochinon treatment—a somewhat tedious process, in no way essential for practical purposes.

The expression "quick Golgi method" is usually applied to that which does away with a preliminary hardening of texture in Müller's fluid for a week or two, but it might be more profitably used in connection with the quickness necessary in the operations following the removal of the stained tissue from the nitrate of silver solution.

Berkley[1] appears to have got good results by a method which differs from that described, chiefly by a preliminary immersion of thin sections of tissue in a saturated solution of picric acid. This is certainly not necessary for obtaining the best conceivable results, and, in my hands, has appeared to present a barrier to the penetration of the essential solutions, by coagulating the surface of the tissue.

Other methods employed in the examination of the central have likewise, in the hands of some, been of service in the investigation of the peripheral nervous system. For the staining of peripheral ganglion cells Nissl's method may yield good results, and I shall show under the microscope the distal sympathetic cells of the heart so stained.

Dogiel's modification of Ehrlich's methylene blue method has been fruitful of good results in his hands.

The method I have personally found most useful is that employed by Sihler of Ohio,[2] which was brought to my notice by Dr. Fred. E. Batten, who used it in the preparation of the specimens on which his recent valuable paper on muscle spindles was based.[3]

The difficulty of staining the peripheral nervous system consists in its fineness, and its being surrounded by texture more or less dense. Stains appear to require application as directly as possible, and with sufficient potency to effect their purpose. Thus, while Ehrlich's intravenous injection of methylene blue stains peripheral nerves, Seme Meyer's subcutaneous injection of the same material, while it acts admirably on the central nervous system, is of little value for peripheral work. For this reason also, Dogiel's direct application of methylene blue appears to act much better on peripheral nerves than the more indirect modes of using that stain which I have mentioned.

Sihler's method is a direct method, and consists—(1) In macerating the tissues to be stained in acetic acid, glycerin, and a 1 per cent. solution of chloral hydrate in distilled water, in the proportions of one each of the two first to six of the last. (2) In staining the macerated tissue for a week or ten days in a mixture which differs from that first used only in containing Ehrlich's hæmatoxylin instead of acetic acid. (3) In placing the stained tissue in pure glycerin. (4) If considered desirable in removing overstaining by acetic acid or Pal's solution.

In using this method, I made thin sections of the organs with Cathcart's freezing microtome, left them for a fortnight or longer in the stain, and in glycerin for an indefinite period. The longer

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[1] *Johns Hopkins Hosp. Rep.*, Baltimore, 1894, p. 50.
[2] *Arch. f. Physiol.*, Leipzig, 1895, S. 202.
[3] *Brain*, London, 1897, pts. 77 and 78.

Fig. 1.—Dark bordered sensory nerve. (*a*) From the pelvis of the kidney of a mouse; (*b*) nodal point whence a branch (*c*) springs, highly magnified; (*n*) nucleus of sheath.

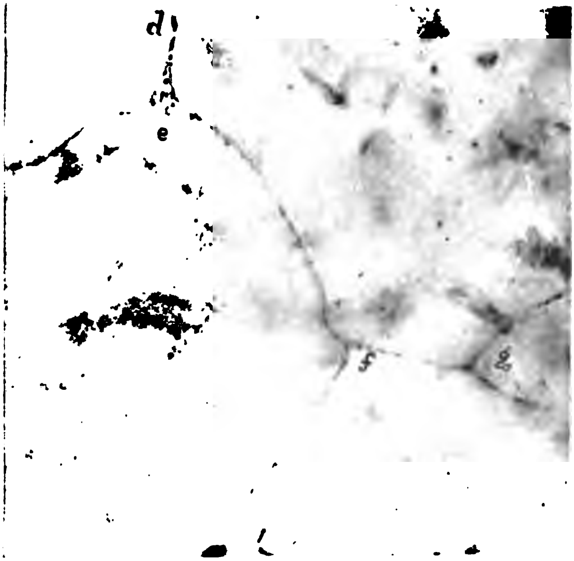

Fig. 2.—Penultimate plexus from the pelvis of the kidney of a mouse. (*d*) Continuation of (*c*) in Fig 1; (*e*, *f*, *g*) nuclear points of dichotomous division.

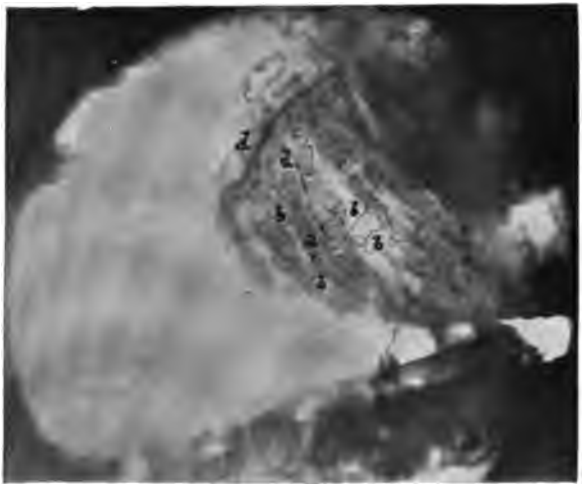

FIG. 3.—Penultimate plexus from the heart of a mouse. (*a*) Nuclear point of division like (*e*) in Fig. 2; (*b,b,b,b*) branching fibrils; (*c*) Krause's Knobs; (*d*) main nerve.

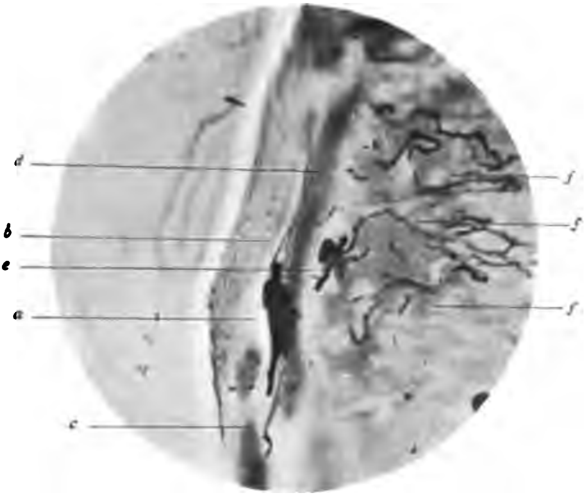

FIG. 4.—Innervation of a vessel in the kidney. (*a*) Ganglionic cluster; (*b, c*) nerve fibres; (*d*) artery; (*e*) retiform ramification of nerve fibrils in vessel; (*f,f,f*) capillary vessels.

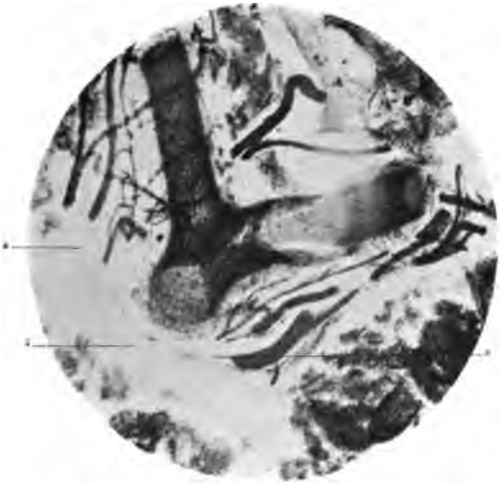

Fig. 5.—Relation of large nerves (*a*, *a*) to vessel (*b*), from the pancreas of a mouse.

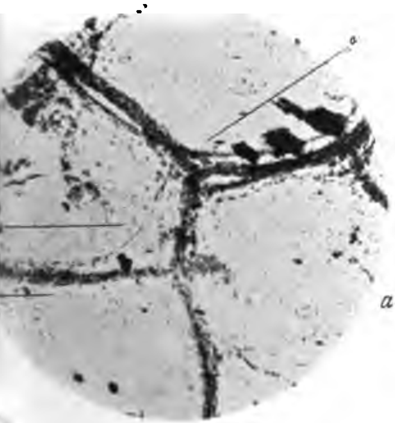

Fig 6.—Mesentery of kitten.
a) Trunk of nerve ; (*b*) branch going
to supply the vessel (*c*).

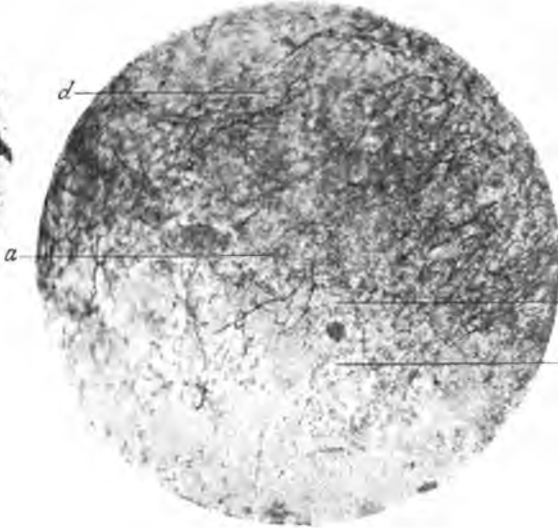

Fig. 7.—Golg preparation of nerves in the spleen of a calf. (*a*) Nerve fibre ; (*b*) Malpighian corpuscle ; (*c*) connecting fibril ; (*d*) nerve fibres and fibrils, some of which have gangliform enlargements.

they remained in glycerin the better I found the result to be, as the staining seemed to be continued in that medium, and the tissue to become softer and more easily teased or squeezed. This I believe was also the experience of Dr. Batten. I am also under the impression that the stain and the medium (Farrants' solution), in which the preparation is mounted, continue to define detail for a time after mounting, and am strengthened in this belief by a statement recently made to me in conversation by Dr. Lionel Beale, that he had had the same experience with the glycerin-carmine method which he has so fruitfully practised.

For the detection of nerve-endings in muscle, and for showing the relation of distal ganglionic cells to nerve-trunks, I found this method very satisfactory; but for the investigation of intercellular nerve-endings in secreting glands, it was less successful in my hands. The profuse nuclear staining which results from the use of hæmatoxylin is a disadvantage in this respect, and, in the case of fœtal structures especially, tends to obscure detail. I did not decolorise many of my specimens, as doing so seemed to me to render the detection of the finer nerves more difficult.

It is just fifty years since Bidder of Dorpat, in 1847, published his pamphlet "Zur Lehre von dem Verhaltniss der ganglien Körper zu den Nerven fasern," with an appendix by Volkmann of Halle, in which he gives a résumé of the knowledge at that time of the relation of ganglia to nerves. He mentions the heated controversy between two young observers of the period, Valentin and Remak, in which the former denied and the latter affirmed the origin of nerve-fibres from ganglion cells.

It is provocative of reverential admiration that, in this early brochure, Bidder mentions the favourable reception—unaccountable to him—accorded to the discovery published in 1844 by a young scientist of Zurich, that ganglia could originate fibres which shortly assumed the double contour of medullated nerves. That scientist was Albert Kölliker, who still, as an octogenarian, graces the ranks of medicine, and this retrospect alone conveys to the mind the long and valuable services of him who in 1896 published a new edition of his histology of the nervous system, and contemplates, with the enthusiasm of perennial vigour, still further work. That he may live to accomplish this must be the desire of all who honour distinguished service in the cause of science, and especially of those who, like myself, have had the privilege of his personal instruction.

Notwithstanding the admirable work of many investigators in the interval, the anatomy and physiology of the sympathetic system, and its relation to the cerebro-spinal centres, remained in many respects obscure, until a comparatively recent period, and debatable questions in connection with it cannot even yet be regarded as settled.

During the last decade our knowledge of visceral innervation has been greatly increased. The invisible (as in other spheres) was previously regarded as the non-existent in many organs, which are now known to be richly endowed with nerves.

The researches of Golgi, Ramon y Cajal, Kölliker, Gustaf Retzius, Van Gehuchten, Sala, Von Lenhossek, Ehrlich, and the Dogiels abroad, and of Berkley and Sihler in America, have done much to elucidate a dark field of inquiry.

To our own countrymen we also owe much, and before referring to later investigators it would be unpardonable not to acknowledge our indebtedness to Lionel Beale, whose position to-day is not identical with that of many histologists, as regards the manner of nerve termination, but whose accurate observations have a permanent value. Gaskell, Langley, and F. M. Balfour of Cambridge, have each, by different methods, rendered clearer to us a subject once the despair of anatomists, physiologists, and physicians alike; and the more recent work of Professor Paterson on the embryology of the sympathetic system has placed in a clearer light the original relation of the sympathetic to the cerebro-spinal system, a relation, as influencing function, to which I shall have occasion to refer again.

We may determine the character and course of a river by following it from its source to its outflow into the ocean; or we may trace it from its distribution to its fountain-head. In examining the innervation of the viscera, I propose adopting the latter method.

The stream of visceral innervation may, in its ultimate distribution, be likened to a delta with three mouths, these points being (1) the secreting cell, (2) the cell of involuntary muscular fibre, and (3) an intermediate or compound and more obscure condition, the innervation of metabolism and excretion.

The innervation of the secreting cell.—A. S. Dogiel of Tomsk, in his paper on nerve-endings in the tear gland of mammals,[1] before proceeding to give particulars of his own investigations, refers to the previous work of others with other glands as establishing a general identity of method in nerve distribution, in secreting glands as a whole. Although some have figured what appear to be nerve-terminals on cells, the general result of investigations hitherto has been, that the actual termination in a cell has not been established. Even the apparent fine endings on or between cells Dogiel regards as due to incomplete staining of continuous nerve-fibrils. His own results, he considers, show that non-medullated fibres surround vessels and ducts; that fibres arising from these primary branches surround in loops the ducts of the gland, and form a plexus on the membrana propria; that small twigs from the latter pierce the membrane and form a network over the cells; and that, finally, extremely fine fibrils, arising from the cellular plexus, find their way between the cells, forming a pericellular or circumcellular plexus, in the meshes of which the cells are, as it were, embedded. Dogiel thus supports the well-known contention of Lionel Beale, that apparent nerve-endings are a fallacious conclusion from imperfect observation, a view which is opposed to the opinion of the majority of histologists of the present day. Dr. Beale's opinion remains the same as in the days of his active histological work. He recently remarked to me, aphorismically, "A nerve-ending has no end." Kölliker, on the other hand,[1] states that the penultimate plexus, which is frequently observed, ends free, and that he is in a position to vouch for this fact in the case of intestinal villi, the spleen, the kidneys, the muscles of the intestinal wall, and the mucosa of gut. Gustaf Retzius also joins issue with Dogiel. He admits with Kölliker and others the occurrence of terminal plexuses, but not of terminal nets or loops.[2] The controversy between Valentin and Remak concerning the origin of nerve-fibres is thus pushed by the discoveries of the intervening period to the extreme limits of the nervous system; and although it cannot even now be considered to be settled in favour of the terminalists, the balance of evidence is on their side.

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[1] *Arch. f. mikr. Anat.*, Bonn, Bd. xlii. S. 632.

A point of great interest, and one which it appears to me can only be determined by the method of induced degeneration, is the discrimination of intraglandular sensory or afferent fibres from the efferent secretory fibres proper. Sensibility is probably essential to all perfect vital action, but the execution of all peripheral functions, as will be asserted again, is in the sphere of the motor division of the nervous system; and to distinguish between these secretory motor fibres and intraglandular sensory fibres by the microscope is not at present possible. These intraglandular sensory fibres are not to be confused with others which cause increased discharges of secretion. This may arise from the most distant stimuli—mental and other. The intraglandular sensory fibres are, nevertheless, the afferent channels for the intrinsic irritability of the cell, and necessary to the quiet and continuous elaboration of secretion characteristic of healthy gland tissue.

A fallacy against which one must be on one's guard in the examination of the intracellular distribution of nerve-fibrils, is the possibility of mistaking the staining of the nuclei of intercellular capillary vessels for nerve elements. In my own examination of this point by Sihler's method, so far, I regret to state that, while I have stained some good penultimate plexuses, I have not met with the success I had hoped for, and have been deceived more than once by the possible fallacy I have mentioned. I have, therefore, had to rely upon the results obtained by other and more skilful histologists, and throw on the screen reproductions of Dogiel's and Retzius' illustrations as representing the views at present entertained by the two opposing schools as to the final distribution of glandular nerves.

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[1] "Gewebelehre," S. 870.

[2] *Biol. Untersuch.*, Stockholm, N. F., Bd. v. S. 50. An explanation of these conflicting views may perhaps be sought in the fact that horizontal sections, which afford a "bird's eye" view of the nerve distribution, in many instances may give the appearance of retiform continuity to nerve terminals, which seem to end free in sections cut at right angles to the innervated surface.

These contending views do not appear to invalidate the conclusion we are at present justified in drawing, that it is by contact of the nerve elements with the secreting cell, not by their incorporation with it, that the activity of the latter is maintained and controlled.

The innervation of the cell of involuntary muscle.—In the case of the voluntary muscle the motor end-plates or end-organs are well-defined bodies, and if the termination of the muscle spindle, so well described by Dr. Batten, be viewed with Sherrington as the end-organ of muscular sensibility, these also are no less well defined, and are to all appearance ultimate, and not penultimate, structures.

In the case of involuntary muscle, on the other hand, there is still room for controversy as to the nature of the ultimate innervation of the muscle cell. The difficulty of examining this question until recently has been so great, that it is not long since histologists of reputation regarded even so considerable a muscle as the cardiac ventricle as very sparsely supplied with nerves. Even now the "ganglion-free apex" plays a considerable rôle in physiological conceptions of the nature of rhythmical movement.

The Golgi methods have shown us, however, that not only is the cardiac ventricle well supplied with nerves, but that it is so richly supplied that there is reason to believe that ilka muscle cell, to vary the poet's language, has its ain twig o' nerve. This is the conclusion come to by Heymann of Ghent,[1] who showed many beautiful specimens of the innervation of the frog's heart, prepared by the quick Golgi method, at the meeting of the British Medical Association in London in 1895, and which probably many present had an opportunity of examining. Numerous observations, prior to and since his, lend support to this view.

The end-organs described as characteristic of cardiac muscle are knob-like bodies, first observed by Krause, and frequently seen since. What I have taken to be such, however, appear to me to be continuous rather than freely-ending structures, and to be enlargements on the fine fibres of a circumfibrillar plexus, similar to the circumcellular plexuses described by Dogiel in secreting glands. Terminal knobs, it is true, may be observed which do not appear to be continuous with any nervous element beyond them, but they so much resemble small enlargements upon nerve elements, which are undoubtedly continuous with similar knob-like enlargements in a continuous chain, that the possibility suggests itself to me, as it did to Dogiel in the case of glandular nerves, that defective staining may account for the apparently abrupt termination of the fibril in some cases. The majority of present-day histologists, however, appear to be as convinced of the free ending of muscular nerves in all involuntary structures as they are of such a termination in the case of voluntary muscle. It is certainly difficult to conceive how otherwise the separate functions of nerve elements, of which there is good physiological evidence, can be secured.

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[1] *Berl. Phys. Soc.*, Feb. 17, 1893.

In the light of modern histology, the ganglionic plexuses which innervate the muscular fibres of the intestine and bladder must be regarded as penultimate, not ultimate, structures. The plexuses, for example, of Auerbach and Meissner, treated by the Golgi method, reveal a far-reaching system of fine processes. This is well shown by a specimen of Kölliker's, which I saw at Würzburg, which is figured in his book.[1] The drawing is a minutely faithful delineation of the original preparation from the plexus of Meissner of a kitten two days old.

The innervation of the intestinal muscles is probably double, as Gaskell and others have pointed out,[2] non-medullated fibres of the vagus supplying the circular muscles throughout the greater part of the alimentary canal, and viscero-motor fibres from spinal nerves, the longitudinal fibres.

The discrimination by the microscope of motor fibres from more sources than one, and of motor from sensory fibres in involuntary muscles, is no more possible at present than it is to distinguish secretory-motor from sensory fibres in glands. As regards the detection of sensory fibres, in the case of those supplying such special sense organs as the Pacinian bodies of the mesentery, and similar bodies which have been found in other organs (for example, the pancreas), we are justified in assuming that we are dealing with a sensory nerve termination. But no such guide to the detection of a sensory, as distinguished from a motor, nerve-ending is at present known in involuntary muscular fibre. If, however, we agree with Kölliker that a medullated nerve-fibre, found in the distant periphery, is to be regarded as cerebro-spinal and sensory,[3] we may have in this a guide to the penultimate distribution of sensory nerves in the viscera.

Specimens from the pelvis of the kidney of a mouse (Plate I., Figs. 1 and 2) show the fine fibres arising from such a source—a plexus, the fine subsidiary divisions of which are countless, but which, in view of the present opinion of the majority of histologists, may be assumed ultimately to end free, as indeed at some points it appears to do in the sections which are figured.

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[1] "Gewebelehre," Fig. 843, S. 868.

[2] *Journ. Physiol.*, Cambridge and London, vol. vii. S. 18.

[3] *Op. cit.*, S. 858.

In the case of the heart, also, similar plexuses may be observed coursing transversely across the muscle bundles. While these probably terminate parallel to the fibres, giving off twigs to the cells, they are conceivably from another source than some of those found running parallel to muscle fibres, and terminating or appearing to terminate in the end-bulbs already mentioned. The importance of this double cardiac nerve supply we shall have to deal with later. Such plexuses are shown in Plate II. Fig. 3.

Future research by staining methods, or by these in combination with the Wallerian method of degeneration, may enable us more accurately to distinguish between the ultimate distribution of visceral motor and sensory nerves, to the benefit of correct anatomy, and as affording a valuable check upon ingenious physiological surmise.

The nervous mechanism of excretion and metabolism.—The essential conditions of excretion are a medium containing the excretion and vessels to convey it to a point at which it is to be excreted, where appropriate arrangements for its conveyance out of the body exist.

If we take the kidney as exhibiting these conditions in a typical manner, we shall be able to study the nervous anatomy of this process, so far as we at present know it. While this organ, however, exhibits the essentials of excretion mentioned, it is also one beset with considerable difficulties for the histologist of the peripheral nervous system. Its close texture and general density render the use of staining methods, as applied to the finer nerve elements, a difficult matter. So great a master in histological methods as Gustaf Retzius recognised and acknowledged this difficulty, and stated that even by Golgi's method the nerves of the kidney did not stain well.[1] He succeeded, however, in staining the vascular nerves as far as the glomerulus, but not further, as many specimens show.

My own attempts to use the chrome-silver method for this purpose were made before my visit to Würzburg, and resulted in little beyond the staining of blood vessels and a few questionable nerves.

A specimen, however, which Herr Hofmann gave me, shows the vascular innervation of the kidney very well. Hofmann also found the organ difficult to stain by the Golgi method, and did not succeed in doing so beyond the point reached by Retzius. A ganglionic cluster, with fine retiform ramification of fibrils, is shown in the preparation (Plate II. Fig. 4). That the blackened cluster is ganglionic is argued from a somewhat similar appearance, presented by indubitably ganglionic material, shown in a preparation of my own on the wall of a blood vessel supplying one of the cervical sympathetic ganglia in a child.

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[1] *Biol. Untersuch.*, Stockholm, N. F., Bd. v. S. 35.

The nerves in the case of the kidney, as in other organs, follow the course of the blood vessels. This relation of visceral nerves to blood vessels is well shown by the preparations which are figured.

The control of the blood-flow in a viscus is no less the note of empire in an organ than is the control of the waterways of our planet the ensign of sovereignty among nations (Plate III. Figs. 5 and 6).

While we have thus failed hitherto, so far as I know, in demonstrating the complete innervation of the glomerular capsule and its connections, there can be little doubt that the nerves are there for staining, and with improvements in methods will, sooner or later, be stained.

It is perhaps allowable to make a guarded inference from the innervation of the somewhat homologous Malpighian body in the spleen. I am fortunate enough to be able to show a good Golgi specimen of the ultimate innervation of the spleen, for which I am indebted to Herr Hofmann. It will be observed that nerve fibrils reach and surround the Malpighian body, even anastomosing over it in the manner in which precellular cerebro-spinal fibrils touch and embrace the ganglionic cells of the sympathetic system. On careful examination, it will be seen that the vascular fallacy may be excluded in this case, as a Malpighian twig may be observed to arise from an unquestionable nerve-fibril (Plate III. Fig. 7). That these bodies, differing in function with the organ in which they occur, may be regarded as probably endowed with nerves in a similar manner, is, I think, a legitimate inference from the ascertained nerve supply of both. The greater facilities which the soft spleen affords for histological treatment, as compared with the hard kidney, may account for the greater success of the Golgi and other methods in the one case, and its comparative failure in the other.

The question of special nerves of metabolism, like that of special trophic nerves, which may be appropriately mentioned in this place, must be left undecided at present. That diminution of the *vis a tergo* necessary to push through metabolism to its normal physiological limit is the cause, rather than abnormal explosion of physico-chemical material, of the defective metamorphosis met with in some diseases, is argued, I would suggest, by the commonly observed clinical phenomenon of deposits of uric acid, in conditions of exhaustion, in some persons who, in robuster health, exhibit the normal metamorphosis of urates. There is much more evidence in support of this view, which we shall consider more fully in its proper place. There is also a good deal of clinical and some experimental evidence to show that the nervous system has a distinct local trophic influence, although the separate existence of nerves for this purpose has not so far been established. We have so far examined the extreme periphery of the visceral nerve distribution, and found that, while there are still noteworthy upholders of the non-terminal conception of the peripheral nervous system, the balance of evidence and trend of histological opinion is in favour of the termination of the sensory and motor nerve supply of the viscera in free ends.

(*To be continued.*)

ON THE SYSTEMATIC PHYSICAL EXAMINATION OF THE CHEST.

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I PRESUME it may be taken for granted that the value of and necessity for physical examination of the chest, in appropriate cases, by the ordinary and well-known methods, is still recognised, at any rate in theory, by the great majority of the members of the medical profession. To my knowledge, however, there are some who either ignore altogether, or attach but little importance to, such examination; while others seem to think it of no service, unless they employ some more or less elaborate instrument or apparatus, not uncommonly of very intricate mechanism. Moreover, it cannot be doubted that the modern tendency is to undervalue its teachings, and with not a few to rely mainly if not entirely in diagnosis upon the facts, real or supposed, revealed by certain special modes of investigation, such as laryngoscopy, examination of the sputum, or the use of the spirometer, the sphygmograph, and the like. I do not for one moment wish to disparage these methods, or to under-estimate the substantial aid which they often render in diagnosis in relation to chest cases, but I submit that in dealing with such cases they ought to be kept in their proper place, and carried out on rational lines, any phenomena they reveal being considered with due regard to those observed in other ways. I am fully aware of, and have in my own experience had to be thankful for, the fact that morbid conditions within the thorax may now and then be discovered or demonstrated by laryngoscopic examination, which cannot otherwise be positively recognised, or perhaps even suspected; but this is quite exceptional, and there is little danger on the whole of excessive claims being made by specialists in this branch of practice. My observation compels me to affirm, however, that there is a decided disposition, not only amongst bacteriological experts, but also in the profession generally, to overrate the value of examination of expectorated materials, and in not a few instances to attach undue significance to its results, to all intents and purposes relying solely and implicitly on its teaching in arriving at a diagnosis, which is often very misleading. Personally, I have had very little clinical use for such instruments as the sphygmograph, except for recording purposes; and for any physician to boast that he never prescribes for a patient until he has taken a sphygmographic tracing of the pulse, strikes me as exceedingly humorous, if nothing more. Of course the employment of any instrument of this kind must be left to individual judgment, but at any rate it ought not, as a matter of routine, to take the place of the simpler methods, and should have some intelligible relation to the case under investigation. Whether in course of time the Röntgen ray is going to save us from the necessity of all other kinds of investigation, by demonstrating to us the exact morbid conditions within the thorax, I do not know, but meanwhile we must utilise to the best of our ability the other means of diagnosis which are within our reach.

But while physical examination still holds its own, on the whole, in theory, it cannot be questioned that in practice, as it is carried out in a large proportion of cases, it might as well be omitted altogether. As a matter of fact it is often omitted, and by some habitually neglected; and it happens more by good luck than good management that more frequent disastrous results do not follow such neglect, though they are quite as common as they need be, or ought to be. What is much more to the point, however, is that the examination is so often conducted in such a casual way—hurriedly, unsystematically, imperfectly, over a limited region, through clothing, etc.—that for practical purposes it is, to say the least, very unreliable, and serious morbid conditions are hence in danger of being entirely overlooked or misunderstood. It is a very important matter to find out the reasons for this state of things, for I suppose everyone would acknowledge that, if physical examination is to occupy its right position as a means of diagnosis, it ought to be practised habitually and as a matter of routine, on an intelligent, comprehensive, and systematic basis. Now, as a teacher and examiner of some experience, I feel bound to say that in many instances the fault lies primarily with the modern student of medicine. He may have acquired sufficient knowledge and skill to pass his examination, but he does not possess anything like a sound and thorough grasp of the subject. And assuredly this is not from any want of instruction or training, for medical students at the present day, in addition to lectures (to which, by the way, they often are not particularly devoted) are so pampered by tutoring, exercises, demonstrations, and cramming, that it is becoming a serious question whether they are not losing in great measure the faculty of and capacity for self-tuition and training, which at any rate may partly account for the deficiency to which I have referred. But the root of the matter lies in this, namely, that a considerable proportion of students will not take the trouble to learn their "business," if I may so term it, in a rational, progressive, and practical manner, beginning with the elementary principles and theoretical aspects of the subject, working through its drudgery, endeavouring to acquire the necessary personal skill and proficiency, and, by repeated observation and self-training, to master its details from different points of view, so far as their necessarily limited experience will enable them. It may be regarded as disrespectful to advancing science, and even shocking, to express such an opinion, but I maintain that, as a matter of fact, it is far easier to become quite an expert in the use of some special instrument for viewing internal parts or recording movements, or even in bacteriological investigations and the like, than it is to acquire even moderate proficiency in examination of the chest, for reasons which I cannot now stop to discuss. Moreover, these so-called scientific methods are to many decidedly more attractive in themselves; they appeal to the cravings of the laity for novelty and "progress"; and from other points of view are by no means to be despised, having a decided advantage in certain important respects, which it is not in human nature to ignore, over the old-fashioned "physical examination."

I must pass over the difficulties which do unquestionably interfere with proper clinical investigation, at the present day, not only in relation to the chest, but also in other directions, associated with the exigencies of modern professional life and practice, and due to want of time, over-pressure of work, excessive number of patients, and other causes. I will only remark on this point, that if he sins at all, which as a rule he does not, the much-abused physician to the out-patient department of a hospital is not the only, or even the chief defaulter in this respect.

I have touched upon the few points dealt with in the preceding remarks, because I think that they ought not to be passed over just now, in any discussion of the systematic physical examination of the chest, and that they present aspects of the subject which are fairly open to criticism. Now, however, I come to the more immediate purpose and practical aim of this communication. Granting that the science and art of physical examination, in relation to the thorax and its contents, have been duly studied and fairly mastered, and that it is habitually and conscientiously carried out in practice, the fact still remains that the results of the investigation are, in a large proportion of cases, by no means so satisfactory or conclusive as they ought to be, or might be. My first duty, then, is to try to explain some of the chief reasons for this fact, as I believe it to be; and I propose afterwards to submit a brief sketch of a scheme or plan of procedure, which I have long been in the habit of adopting for clinical instruction and personal record of cases, and which I naturally think has advantages, at any rate in the way of making the examination more methodical and simple, and its results more definite. Whether it is likely to prove of use as a guide to any who may read this article, must be left to their individual judgment.

It must be understood at the outset that the following remarks are intended for those who have gone through the usual process of training in relation to physical examination, which forms a recognised part of the medical curriculum. During this process it is customary and natural to study first the *methods* to be employed, those ordinarily practised being quite familiar under the terms inspection, palpation, percussion, and auscultation; to acquire a comprehensive knowledge of the *purposes* for which each method is employed; and to become practically acquainted with the *physical signs* which they severally reveal, or which may be elicited by their aid. This " first stage " in the course of the instruction, if I may so term it, has come by almost universal concurrence and practice to form the basis upon which the *clinical description* and *record of cases* is founded. That is to say, it is the custom to take each method in succession as a heading, and to range under this heading the signs which happen to belong to it in the particular case under investigation. As regards percussion and auscultation, this plan must necessarily be followed in the large majority of instances, though not entirely and invariably, as I shall presently show; but even in relation to these methods the descriptions given not uncommonly suggest that the purposes which they serve, and the phenomena which they are intended to study, are not always so clearly appreciated and understood as they might be. But the point I wish to enforce is this—I have a strong impression that the mode of procedure just indicated adds considerably to the difficulties of chest examination; leaves important phenomena in many instances practically unnoticed, or at any rate very inadequately studied; involves needless repetitions; and altogether tends to lead to much confusion and obscurity, which I have personally often felt when attempting to understand and interpret the meaning of the signs described in a particular case. Another difficulty to be noted in this connection arises unfortunately from the various classifications and nomenclatures adopted by different writers in relation to many physical signs, which, however, it does not seem possible to overcome at the present time. A further source of confusion, which can be easily avoided, and ought to be invariably, is the mixing up in an indiscriminate way of the signs associated with the respiratory and circulatory systems respectively, to which the usual mode of describing cases readily lends itself.

I come, then, to the plan of procedure which I venture to submit as preferable to that just discussed in several important respects, and as at any rate worthy of consideration. Speaking generally, it is my practice, not to study or describe the physical signs under each *method*, but rather to fix attention upon the several *objects* or *purposes* for which physical examination is intended; or, in other words, to regard the subject, both theoretically and practically, from the point of view of the *signs* which have to be investigated. These are taken consecutively and in due order, according to a system which I shall presently explain more fully; and the phenomena to be described and recorded are arrayed under certain definite headings. In carrying out this plan, I propose, in relation to each object or class of signs, to indicate the method or methods by which they are severally studied, and I regard this as an important element in the scheme. I maintain that it is more intelligible and systematic for recording purposes, as well as more thorough and definite in its results, while it saves unnecessary repetition. Further, it brings into well-merited prominence the simpler methods of investigation—namely, inspection and palpation—which are particularly liable to be either altogether ignored, or practised in the most casual manner; shows the true value and practical usefulness of certain more special and exceptional aids to examination, which under suitable circumstances may prove of the greatest service in diagnosis; and trains the clinical observer in the employment of different methods in combination, which often affords conspicuous help in the study and investigation of individual signs.

Owing to the necessary limitations of this communication as regards space, while endeavouring in the following sketch to give a comprehensive outline of the mode of procedure which it is my desire to commend, it must be understood that it will be impossible for me to enter into any lengthy details on the present occasion.

I. GENERAL EXAMINATION.—In my "Lettsomian Lectures," delivered before the Medical Society of London in 1895, on "The Combinations of Morbid Conditions of the Chest," I enforced the principle "that every chest case should be approached with an open, 'comprehensive' mind, and an unbiassed judgment, both as regards structures and diseases." This applies with special force to physical examination, which in its initial stages should be conducted entirely from a general standpoint, and without immediate reference to the respiratory or circulatory systems, or to any other structure. The object of such examination is, in the main, to recognise the presence and nature of physical conditions, normal or abnormal, associated with the thorax; and it is the safer plan to proceed on the assumption that it is not uncommonly impossible to foretell in a given case what structures happen to be affected, what particular morbid changes may be met with, or in what combinations they may be presented for consideration. Nor must it be forgotten that certain of the abdominal viscera, as well as various morbid conditions within this cavity, in not a few instances materially influence the physical signs connected with the thorax. Apart from this aspect of the subject, however, there are two steps in the investigation to be discussed, which come more strictly under the heading "General Examination."

1. *Superficial structures.*—When examining the chest, I always make it a rule first to study adequately and on certain lines the superficial soft structures covering this region, at the same time taking in those of the neck, and in some cases of the face, head, and arms. So far as I have observed, this point is almost invariably ignored in clinical investigation and description, unless some striking sign or morbid condition happens to be present, and yet it often gives important information in several ways. The methods to be usually employed are inspection and palpation, or rather, digital examination, pressure with the fingers being frequently of much service. Percussion and auscultation, however, yield definite signs of certain special conditions associated with the superficial tissues, and must not be forgotten. It is not practicable to draw the line between what may be regarded as mere signs of intrathoracic diseases, and actual morbid states of the chest coverings; but it may be remarked that the latter not uncommonly afford positive indications of some internal trouble, and should then be looked upon as signs, while they are also worthy of recognition in themselves. I have discussed "Morbid Conditions of the Chest Walls" comprehensively in Quain's "Dictionary of Medicine," and I must refer the reader to that article for general information on a subject which I am afraid, as a rule, receives little or no notice. Here I can only call attention to a few practical points relating to the matter now under consideration.

In the first place, it is always most desirable, when examining the chest, to take into account the mere general condition of the patient, as regards the amount and thickness of fat and muscle covering this region; nor, in females, must the size of the mammary glands be forgotten. Not only may differences in these respects materially influence and modify certain tactile signs, and those brought out by percussion and auscultation in relation to internal structures, but they are liable, if not duly noted, to lead to serious misconceptions and mistakes with regard to other kinds of phenomena. Thus a well-covered thorax, especially with fat, may certainly give a much too favourable impression as to its dimensions and capacity, and *vice versâ*; while I have again and again known serious intrathoracic disease diagnosed, usually phthisis of course, and even pulmonary cavities detected, which did not exist, simply because there were marked supra- and infra-clavicular depressions associated with muscular wasting, due to some entirely different cause, such as gastric cancer or progressive muscular atrophy. In relation to this point I venture to remark that, from a want of attention to the chest coverings, the measurements of this region given in the case of candidates for life insurance are often absolutely unreliable and useless as a guide. It is worth noting in this connection, that a peculiar fulness of the soft structures above the clavicles is not uncommonly met with in health, which is of no particular significance, but might be regarded as a morbid phenomenon, if not duly known and understood.

The skin and its appendages have also to be thought of as parts of the superficial coverings of the thorax, when this region is under investigation, apart from any morbid changes which they may present. The clinical observer must always be on his guard against being misled by cutaneous hyperæsthesia, which may be marked even on the gentlest palpation or percussion, or when the stethoscope is applied in the lightest manner. Of course it must be noted, and may be highly suggestive. In acute cases it may be indicative of some internal inflammation. It will suffice to mention the possibility of being led into error by the adventitious sounds brought out during auscultation in connection with a hairy chest, or even by the dried epithelium left after the application of a blister, or of iodine, but a little experience and care ought to obviate any such mistake. I may observe, by the way, that applications to the chest, for therapeutic purposes, are sometimes employed with such severity, that they make the skin so painful and sore as to render satisfactory physical examination of this region most difficult or even impossible.

With regard to the abnormal signs or conditions which have to be more particularly looked for in connection with the superficial thoracic structures as diagnostic factors, without entering into details, they may be summarised as:—

(*a*) Certain conditions of the skin, such as evident stretching or local redness. Extensive scarring after a burn or scald is also worthy of notice; and some attach importance to certain cutaneous affections.

(*b*) Indications of direct interference with either of the large veins within the thorax, or one of the smaller vessels, especially cyanosis with turgidity or œdematous swelling; dilatation and varicosity of the superficial veins; or enlargement of venules.

(*c*) Undue irritability of the muscles to digital examination or percussion—a phenomenon, however, not to be made too much of.

(*d*) Subcutaneous œdema, extensive or limited, apart from venous obstruction.

(*e*) Subcutaneous emphysema, readily recognised by peculiar tactile, percussion, and auscultatory signs.

(*f*) External evidences of past or present morbid conditions within the chest, such as signs of a pointing empyema or abscess; old scars or discharging sinuses; enlarged lymphatic glands, especially in the neck, the infraclavicular region, or the axilla; indications of an aneurysm, or other form of tumour encroaching upon the superficial tissues from within; or the effects of actinomycosis.

(*g*) Actual diseases or lesions of the soft structures themselves, for example, congenital or acquired deficiencies of the muscles, affecting also the cartilaginous and bony framework to a variable extent, and permitting protrusion of internal structures; conditions associated with disease of bone or periostitis, in the way of inflammation, abscess, etc.; infiltrated cancer or tubercle; or an independent abscess, cyst, or tumour, originating in the superficial structures.

I have already referred to the necessity of taking note of the state of the normal structures over the chest, as modifying certain physical signs associated with this cavity, and giving erroneous impressions as to its dimensions and capacity. A similar difficulty may arise in connection with some of the morbid conditions enumerated in the preceding summary, especially subcutaneous œdema or emphysema, or extensive infiltration of the tissues with a new growth. In very exceptional cases I have found the last-mentioned condition absolutely prevent any satisfactory examination of the intrathoracic structures.

2. *Size and shape of the chest.*—The next step in the systematic examination of the chest is to study its size and shape or conformation, comprehensively and in its various details, unilateral and local, these points being considered in their mutual relations. This part of the investigation is essentially general, and it is particularly important not to fix upon any one organ or structure, or to come to a too hasty conclusion as to the cause of any deviation from the normal, as it may depend upon a great variety of conditions connected with different structures, and they are often more or less associated in the same case. When intelligently and adequately studied, it may be affirmed that the dimensions and conformation of the thorax afford most valuable information in a very large proportion of cases. The points to be noted should be definitely known beforehand, and then, as a rule, the examination need not be prolonged or elaborate; otherwise, it can only lead to unsatisfactory results, whatever scientific apparatus may be used.

The methods generally required, and, as a rule, amply sufficient for the purpose, are inspection and palpation, either employed separately or in combination, and, at any rate, they should never be set aside, though at the same time to be of any real service they must be practised efficiently, and not in a careless or aimless manner. When carrying out inspection for this object, it is obviously important to get a good view of the chest as a whole, front and back, otherwise very erroneous conclusions may be arrived at. Under ordinary circumstances, and if there is no reason against exposure, it is well to strip the thorax for a moment, and then, having taken in with a rapid glance what this general inspection can reveal, to protect the region by some suitable covering, and proceed more leisurely to study the various details which may need attention in different cases, by the aid of sight and touch, exposing limited portions of the surface in succession, as may be required.

But while these simple methods of investigation give all the necessary information, as a rule, and at any rate are quite adequate for the routine of general practice, the more accurate determination of certain points relating to the size and conformation of the chest, by the aid of measurements, or even by the use of particular instruments, forms a legitimate part of the investigation, and may lead to most valuable results in suitable cases, especially for recording purposes, and for future reference and comparison. Personally, I do not resort to these aids except when I really need them, but individual judgment must be the guide in this matter, though I must express my own strong objection to any very elaborate apparatus. The tape-measure and callipers may be distinctly helpful; while the cyrtometer is also capable of giving most useful information in certain cases. Dr. Graham Brown of Edinburgh has recently devised an instrument, which he calls the "perigraph," and which is described in his work on "Medical Diagnosis," 4th edition. Its purpose is to obtain tracings of the outline of the thorax more reliable than the cyrtometer affords, and also tracings taken in places where the cyrtometer cannot be applied. Of the use of this instrument I have as yet had no experience, but it seems to promise good results. In cases where there happens to be some interesting or peculiar malformation of the chest, I have occasionally found it worth while to take a mould of the surface, or to photograph the patient.

I am afraid it would lead me beyond the intention of this article if I were to attempt to give even a summary of the points to be noted in relation to the object of physical examination now under discussion, and I will only offer two or three remarks on this matter. It is always well, in the first instance, to endeavour to obtain some idea of the normal chest under investigation, in relation to the individual, due allowance being, of course, made for the conditions of the superficial structures already referred to. Moreover, it must be remembered that one important purpose of this part of the examination is to endeavour to realise, so far as is practicable, the true capacity of the thoracic cavity. The evidences of disease, past and present, exhibit great variety, both individually and in their combinations, although we usually classify them under the heads of general, unilateral, and local, the deviations from health being in the direction either of enlargement or diminution in size. Temporary local bulging is observed in exceptional instances, developed by the act of coughing, and associated either with a pulmonary cavity or a hernia of the lung. Not uncommonly more or less pronounced deformities of the chest are met with, not depending at all upon intrathoracic morbid conditions. When studying the conformation of the chest, it is often desirable to pay special attention to the intercostal spaces, the costal angles, and the supra- and infra-clavicular regions.

(*To be continued.*)

SOME CASES OF CEREBRAL DISEASE IN WHICH THE FUNCTION OF RESPIRATION ENTIRELY CEASES FOR SOME HOURS BEFORE THAT OF THE CIRCULATION.[1]

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THE cases which I proceed to relate illustrate a remarkable point to which attention has not hitherto been much directed in clinical study, namely, the persistence of life for some hours in the absence of all respiratory effort. Such cases cannot be of frequent occurrence, or they would certainly have been more fully recognised in the present day, when attention is so carefully directed to the minutest clinical details. As I shall point out, however, several surgeons have observed the facts of which I now give details.

I append the notes of four cases in which the respiratory function ceased for varying periods of time before death.

CASE 1.—M. E., female, æt. 15—under the care of Mr. Butlin—5th June 1896.

History—Present condition.—27th May.—Vomited; headache.

1st June.—To bed; been sick two or three times daily, not immediately in relation to food. Headache always referred to back of head; no shivering; constipated; no fits.

Previous history.—Measles, five years ago; otorrhœa (left) for one year.

Present condition.—Not unconscious, dull, much pain in head, but no retraction—chiefly occipital pain in paroxysms. Eyes.—Pupils equal; react; no squint; early optic neuritis, both eyes. Pulse, 60; respiration, 20; heart and lungs natural. Urine, 1028; albumin. Abdomen retracted; no fever. Temperature, 99°. Knee-jerk present. Very offensive discharge from left ear; membrane gone, granulations seen growing from middle ear; no tenderness over mastoid region.

6th June.—Temperature subnormal; pulse, 58; has vomited several times—green and watery matters with some mucus.

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[1] Read (in French) in the Section of Medicine, International Medical Congress, Moscow, August 1897.

7th June.—More drowsy; operated on by Mr. Lockwood.

6 P.M.—Trephined 1 in. above left ear, at a point in a vertical line with the meatus.

Patient's condition did not allow of exploration of cerebellum; trocar put into brain substance, no matter escaped. Respiration failed. Artificial respiration until 9.45 P.M., when heart stopped also.

Temperature on admission, 99°, afterwards 98°; pulse almost constant, 60; respirations, 22–24.

Post-mortem examination.—External anterior meatus and middle ear full of blood and granulations; middle ear much eroded, and communicating directly by an opening in its posterior wall with an abscess in the cerebellum. Roof of tympanum very thin, but not actually perforated; some pus in petrous bone, with slight localised meningitis around it, none anywhere else. Cerebrum quite natural. Cerebellum. —At anterior and outer part of left cerebellar hemisphere an abscess, 1½ in. wide antero-posteriorly and 1½ in. transversely. Left side of pons and left superior peduncle flattened; very little brain substance separated the abscess from the fourth ventricle. Pus of dirty green colour, and viscid—not offensive. No disease found in any other part of the body.

CASE 2.—M. F., female, æt. 21; a box-maker; admitted 7th October 1896, under Sir Dyce Duckworth's care. Quite well till fourteen days ago. Then sore throat and severe frontal headache—occasional at first but afterwards continuous. Screamed out at night.

1*st October.*—Vomited several times. For past week or ten days pain in right ear. Often had discharge from ear, but not constantly with pain, and has been slightly deaf with right ear for past two months. Increasingly drowsy looking since onset, and heavy. For one week been in bed, delirious, and has sweated much. Bowels confined; no urinary difficulty; no ocular symptoms.

Previous illnesses.—None of importance; winter cough; no hæmoptysis. On 21st September fell on pavement, did not hurt her head.

Family history.—Father died of "consumption"; nothing else of importance.

Present condition.—Well-nourished, sleepy looking, continual frontal pain, increased by pressure, and slight pain on pressing right external auditory meatus; none over the mastoid process. Slight discharge from the right ear. Eyelids drooped. Eyes.—Pupils equal, react to light and accommodation; no squint, no nystagmus. Fundus.—Natural veins readily seen pulsating. Pulse, 48; regular; moderate tension. Heart.—Nothing abnormal to note, either in position of apex or area of cardiac dulness. Reduplication of first sound at apex. Lungs.—Nothing abnormal discovered. Abdomen.—Not retracted, no viscus felt. Legs.—Knee-jerk obtained; no ankle-clonus; no paresis noticed anywhere, except drooping of eyelids; sensation not impaired. *Tache cérébrale* readily obtained. Temperature on admission, 100°·4. Urine.—Sp. gr., 1020; acid; albumin, 0; sugar, 0. Bowels.—Confined.

11*th October.*—General condition not so good; still much pain, only temporarily relieved by phenacetin. Increased pallor, slight flattening of left side of face. Pulse.—Dicrotic and of lower tension, still infrequent, irregular. Respirations.—Occasionally sighing. Quite conscious. Temperature fallen since admission, now 98° to 99°.

12th October.—Very restless night; no sleep till 5.30 A.M.

11 A.M.—Sleeping deeply; breathing regular, 22 to minute. Pulse, 68; more irregular. Pupils, right larger than left.

11.15 A.M.—Snoring loudly.

12.15 P.M.—Breathing stopped; patient growing blue; artificial respiration begun; patient made a few attempts to breathe. Slight double external squint; pupils insensitive to light; no corneal reflex. Temperature, 98°·8.

1.45 P.M.—Condition unaltered; artificial respiration continued.

2 P.M.—Oxygen gas was given.

3.30 P.M.—Condition still unchanged.

3.45 P.M.—Trephined by Mr. Langton behind right mastoid process; exploring needle inserted in various directions, and finally a little pus obtained. Cannula inserted, but no more pus withdrawn. During the operation, artificial respiration being stopped, the patient grew increasingly blue, and pulse could not be felt at the wrist; but with renewal of artificial respiration and oxygen, and injection of liquor strychninæ, the patient got a good colour, and the pulse at the wrist became of good volume.

5 P.M.—Pulse gradually failed, and patient died. On examining the eyes immediately after death, there was no definite optic neuritis. Respiration ceased 12.15, and heart ceased to beat four and three-quarter hours later.

Treatment.—Phenacetin was used for the relief of pain in the head; 2 drms. were given between 6.30 P.M. on the 10th, and 5 A.M. on the 12th. During the last five hours of life liquor strychninæ was used freely hypodermically.

Post-mortem.—No sign of meningitis except just at roof of right tympanic cavity. Dura mater grey and sloughy, and an opening connecting middle ear with an abscess in right temporo-sphenoidal lobe. No increase of cerebro-spinal fluid. Right temporo-sphenoidal lobe swollen; convolutions much flattened; contained an abscess the size of a hen's egg. Much sclerosis of the right petrous bone, which contained a little caseous pus. No necrosis. No other lesion of importance found in any other part of the body.

CASE 3.—W. C., æt. 36; carpenter; admitted to Rahere Ward under Dr. Brunton, 6th May 1897, and transferred to Charity Ward under Mr. Butlin, on 9th May. He came in complaining of headache and vomiting.

History.—Present condition.—For the last five months has been losing flesh. Fourteen days ago headache began, and got worse till 1st May, when he went to bed.

2nd May.—Was very hot and had profuse sweating.

5th May.—Diarrhœa (three times a day). Vomited four times before admission; the vomiting now only occurs after taking medicine. He has been delirious since the 3rd May; before that date he had complained of pain in the lower part of his back.

Previous history.—Enteric fever fourteen years ago.

Family history.—None of importance.

Present condition.—Patient is very restless; he lies on his back with his legs drawn up, and tries to get his feet out of bed. He appears to be semiconscious, and objects to being disturbed. Has hiccough. Keeps his head turned to the right, and objects to having it rotated to the left. Temperature, 100°·6. Face.—Skin slightly moist; left side smoother than right; no apparent paralysis; numerous minute dilated venules on the cheeks. Eyes.—Orbicularis acts strongly on both sides; some mucoid discharge from the left eye. Pupils equal, react to light, not dilated nor contracted. *Per* ophthalmoscope.—Both discs swollen; the apparent outer edges blurred. Veins distended and tortuous; arteries small; outer edges of disc very white. *Tache cérébrale* is easily obtainable. Tongue.—Dry and furred; sordes on lips and teeth. Chest.—Natural; a systolic murmur heard at the apex. Abdomen.—No distension nor retraction. Legs.—No rigidity; no paralysis; knee-jerks natural. He passes his urine under him.

7th May.—Not been sick; much quieter; hiccoughed twice. He is quite sensible, and complains of pain in the frontal region; has passed his urine naturally. He has an offensive discharge from his right ear. There is no swelling nor tenderness over mastoid process. A perforation is seen in the upper part of the drum.

8th May.—Slept quietly; still irritable.

9th May.—Much more drowsy; breathing stertorous; corneal reflexes almost gone; pupils are unequal, the right being larger than the left. Coma increased at about 12 noon, when respiration ceased, and artificial respiration was resorted to. Liquor strychninæ (5 minims) was injected subcutaneously, and repeated at 1 P.M. Oxygen was given as required. There was some temporary improvement, and patient was taken to the theatre after Mr. Butlin had seen him for the first time. Patient was anæsthetised and given liquor strychninæ (13 minims); artificial respiration was meanwhile kept up by rhythmical pressure on the sternum. The respiration centre appeared to be inhibited, and the chest was consequently in a state of over-inspiration. Mr. Butlin operated, and made a horizontal incision about 4 in. long, and a little below the level of the pinna, with a slight convexity downwards. The bone being laid bare, a small trephine was applied 1 in. above Reid's base line, and 1¼ in. behind the level of the external meatus. When the bone was removed the dura mater bulged into the cavity; it was of a purplish colour, and did not pulsate. Mr. Butlin made a small puncture in it, and, having passed a good-sized director about 3 in. forwards and inwards, pus at once flowed out freely, mixed with a good deal of blood. A medium-sized drainage tube was put in, entering well into the abscess. During the operation, as soon as the intracranial pressure was relieved, the breathing became normal, and artificial respiration was stopped.

On returning to the ward, the patient remained comatose. Respiration, 32; pulse, 132, full and bounding, but of low tension. Pupils dilated, but did not react to light. There appeared to be some slight palsy on the left side of the face. Patient was lying slightly on the left side, and the cheek became puffed out at each expiration. The jaw had to be continually pressed forwards to insure breathing. The patient did not recover consciousness, and died at 6 P.M. (about two hours after the operation).

Post-mortem notes.—External appearance.—A fairly muscular man. Behind the right ear a recent operation wound with drainage tube and stitches *in situ*. Head.—A trephine hole on right side, ¾ in. (18 mm.) in diameter, the centre being situated exactly 1½ in. (36 mm.) above and the same distance behind the external auditory meatus. The dura mater below this had a small wound in it, in which the drainage tube lay. There was no pus outside the dura mater nor anywhere outside the brain, nor were there adhesions between the membranes and the brain except at the outer and the back part of the upper surface of the right petrous bone, where a small tract led directly from the right middle ear to a large abscess in the right temporo-sphenoidal lobe. The temporo-sphenoidal convolutions were much flattened. The abscess was evidently rather old, as it had very well-marked pyogenic membrane. It measured exactly 2 in. in the antero-posterior diameter. Its centre lay exactly above the centre of the external auditory meatus. Its anterior border was ⅘ in. from the point of the temporo-sphenoidal lobe. The posterior edge did not reach quite so far back as the trephine hole, about ⅛ in. short of it. Superficially, it was covered by a thick layer of brain, about ⅜ in.; but on its deeper surface not more than ⅛ in. separated it from the lateral ventricle. No actual communication with the lateral ventricle could be found. The drainage tube lay in the abscess cavity, which had been opened from behind. The ventricles of the brain contained blood-stained serum, but no pus. There was a good deal of blood and turbid serum at the base of the brain in the posterior fossa. In the pons several small hæmorrhagic streaks; they were quite recent, and appeared to be the result of intracranial pressure. The cerebellum and other parts of the brain were normal. The petrous bone on the right side was the seat of old caries and full of pus. The left one was normal. The abdomen and its viscera were quite natural.

CASE 4.—E. F., æt. 26, G.P.O. guard, under the care of Mr. Walsham.

History—Present condition.—22nd April, 4 P.M.—Patient was struck on the head by a heavy letter-bag. Noticed nothing, except headache, until 7.30 P.M. that day, when he complained of feeling something "burst in his head," and became faint.

Present condition.—Patient lies in a semiconscious condition, but can answer questions when roused. Pulse 44, bounding. Pupils equal. Corneal reflex lost in left side only. Paralysis of left side, and attacks of rigid spasm in limbs.

24th April.—Patient is more drowsy; left pupil larger than right; has had twitchings on the right side. Temperature on right side, 98°·4; on left, 98°·6. Patient was trephined over fissure of Rolando on right side. Dura mater tense; no pulsation. Dura mater incised; a small quantity of blood escaped.

Patient's pulse went up from 44 to 120 at once, and respiration ceased. Artifical respiration was performed, and the right ventricle was aspirated, half an ounce of blood being drawn off. The wound was sewn up. Artificial respiration was kept up for five hours before the heart stopped. Patient never breathed naturally during the whole time.

Post-mortem.—A small quantity of blood found beneath the pia mater. Brain.—At the junction of the right temporo-sphenoidal, occipital, and parietal lobes, there was a ragged hole leading into a cavity as large as a walnut, situated immediately below the cortex. This was full of blood-clot. A ragged cavity, 2 in. in length, was found to extend forwards from this; the blood had burst into the lateral ventricles. No evidence of any disease of brain substance or vessels.

Professor Macewen of Glasgow referred briefly to cases illustrating the peculiarity in question, in his work on "Pyogenic Infective Diseases of the Brain and Spinal Cord," published in 1893; and in several of the cases related in this work there were observed depression of respiratory function, together with a slowing of the cardiac action. In his lectures at San Francisco in 1896, he reported cases where the pulse-rate was lowered to forty and twenty in the minute, as the intracranial pressure increased. He noted the occurrence also of modified respiration, somewhat of the Cheyne-Stokes type, in cases of abscess of the cerebellar fossa, leading to death from pressure on the respiratory centre, the pulse remaining quick and strong. In one case artificial respiration was carried on for twenty-four hours, the pulse never flagging all the time.[1]

Professor Macewen informs me that he has lately met with two cases, in each of which the breathing was re-established after hours of artificial respiration, and in one of these he opened and evacuated a cerebellar abscess while artificial respiration was being practised. In this case the relief of the cerebellar pressure greatly improved the general condition, and soon afterwards the respiration became voluntary. The patient recovered temporarily, dying from cardiac failure, probably due to exhaustion. The restored breathing continued perfect to the end of life.

Professor Macewen has observed this phenomenon in a case of apoplexy, and in a very peculiar one, in which the brain centre was active, but where the respiratory apparatus was destroyed by a crush, the heart continuing to beat, and producing at each impulse a crackling of the broken ribs.

Mr. Victor Horsley called attention to cases of this kind in a paper published in the *Quarterly Med. Journ.* for July 1894, referring to the fact that patients suffering from cerebral hæmorrhage, cerebral tumours, depressed fractures of the skull, and sudden and violent concussion, especially when applied in the occipital region, die from respiratory and not from cardiac failure, as is often supposed; and he quotes Dr. Hilton Fagge's observation that some patients with cerebral tumour or abscess die from failure of the respiration.[1] He also points out that Leyden demonstrated, in 1866, the effects of increased intracranial pressure in slowing the pulse, causing stertorous respiration and arrest of the latter.[2] Horsley and Walter Spencer confirmed these researches, and Leonard Hill has since reconfirmed them.

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[1] *Occidental Med. Times*, San Francisco, November 1896.

Horsley's clinical studies show that, in cases of cerebral tumour, hæmorrhage, and inflammatory foci, death is apt to occur suddenly from arrest of the respiration, and that such is the common end of all cases of pathological intracranial tension, especially when the disease is extremely chronic. He offers the suggestion that, in cases where patients fall apparently dead after sudden blows on the head, and are believed to die from cardiac failure, the real cause may be an arrest of the respiratory function, and possibly remediable by the practice of artificial respiration.

Direct experiments prove that bullet wounds of the cerebral hemispheres are followed by arrest of the breathing, and that recovery may follow when artificial respiration is employed, provided no hæmorrhagic pressure is exercised upon the respiratory centre. Again, in death by hanging, the function of respiration is suspended before that of the circulation.

The temperature in the foregoing cases was chiefly noteworthy in respect of the absence of pyrexia, save in the third instance. The tendency in all was towards subnormal temperatures, and in the case in which the highest figure was reached there was a rise from 96°·8 to 102° within sixteen hours, and operative procedures were begun at that time. These low temperatures are noteworthy in view of the several processes which were in progress within the skull. This thermic depression is, however, now well recognised in the secondary stages of cerebral abscesses, and is a feature of such cases. With the cessation of respiratory function we might expect a marked reduction of temperature, to an even greater degree than occurred in these cases. In my case there had been a free employment of phenacetin, which might have further reduced the temperature.

The occurrence of suspended respiration for several hours in the highest mammalian organism, together with that of continued circulation of the blood for long periods, is very remarkable. Respiration may be carried on in animals which have been depleted of their blood and have had water introduced in place of it. But, in fact, with respiratory cessation, death has practically already begun; and the respiratory centre, unless relieved of undue pressure, ceases to act. Although in such close proximity to the cardiac centre, the former is clearly much the more sensitive of the two, and lesions involving both tell primarily and with most force upon it. We may take it that the respiratory centre is the first to give out, and that it is the most vulnerable of all the great organic nerve-centres, the first to resent undue intracranial pressure.

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[1] "Principles and Practice of Medicine," 1886, pp. 526 and 551. In one case the respiration ceased thirty-five minutes before death; in another, of multiple cerebral abscess in the posterior and middle lobes, the breathing stopped ten minutes before death occurred.

[2] *Virchow's Archiv*, 1866, Bd. xxxvii.

The clinical lessons of cases such as I have described are the following:—

1. That efforts be made promptly to relieve intracranial pressure by trephining and probing.
2. To maintain artificial respiration diligently as long as necessary; that is, until the respiratory centre can resume its function independently.
3. To regard a lowered temperature as no contra-indication of purulent foci or hæmorrhagic foci in the brain.

The fact of depressed or normal temperature is as significant in these cases as is the same occurrence in many examples of purulent peritonitis.

I desire to express my thanks to my hospital colleagues for kindly allowing me to make use of their cases for this communication.

THE THERAPEUTIC VALUE OF SPLEEN EXTRACT.

By A. Campbell Clark, M.D., F.F.P.S.G., *Medical Superintendent, Lanark County Asylum, Hartwood.*

That spleen extract will *per se* cure insanity is not the thesis of this paper. An investigation, extending over two years, has led to results not anticipated at the outset, and established beyond doubt the therapeutic value of spleen extract. Briefly it may be stated, that it aids digestion and nutrition, increases the cutaneous circulation, stimulates the glandular activity of the skin, and produces other effects to be afterwards described.

The first object aimed at in my investigation was the cure or alleviation of mental disease, this purpose being suggested by the frequency of splenic deficiency noted in asylum post-mortem records. The latter point will be referred to subsequently. Being particularly desirous that no hasty conclusions should be drawn in favour of this treatment, and no results prematurely published, I submitted for trial a first series of cases of a most intractable character—cases of chronic inertia, mental and physical. Some of these had been put under a course of thyroid treatment previously, without any good mental result, there being only slight and temporary reaction in a few of them.

After this class had been studied under spleen treatment for more than a year, we were constrained to admit that the mental result was *nil* in several, a slight improvement in a few, and recovery in two male cases. While it may be too sanguine an estimate to say that the recoveries were due to spleen extract, it would be going too far to assert that they were not. We can only state a sequence of events, namely, spleen treatment, followed by improved bodily health, undoubted mental recovery, return to work, and restoration of wage-earning capacity. These two young men have been at work, one for over a year, the other for over six months; and, judging of them by others, some credit, at least, is due to spleen treatment.

The second class of cases was more favourable mentally, though physically below par. It included recent cases of insanity, the mental breakdown being due to physical exhaustion—patients suffering from prolonged lactation, puerperal weakness, anæmia, anorexia, and nervous exhaustion; in fact, hospital cases of various kinds. The results in such instances were more prompt and decided in the majority, not only physically, but soon after mentally, some being restored completely, while of a greater number it could only be said that they were improved.

A third investigation was the logical outcome of the first and second. Careful observation, repeated comparison of one case with another, increased evidence in other directions, gave new suggestions for the selection of cases. Attention was becoming more and more directed to the changes in the skin and complexion, which appeared almost as a matter of course to follow the exhibition of spleen extract. In the case of one girl—inert, inanimate, and unwieldy, with cold hands and feet, grey complexion, and scurfy skin—we were struck by the quick blush excited on the cheek on momentary rubbing of the skin, by the disappearance of scurf, the clearing of the complexion, and the altogether healthier condition of the skin. A study of this and many other cases rendered it certain that the skin and its secretions were influenced by spleen treatment, and our next move was to try it for skin diseases. Dr. Charles A. Bois, in one of the male wards, after trying a case of psoriasis of the chest with thyroid without success, except in rather dangerous doses, began with spleen treatment, after having allowed a considerable interval to elapse. In six weeks the psoriasis had almost entirely disappeared. Coincidentally with this, Dr. Neil T. Kerr, in one of the female wards, treated a case of much more chronic eczema of the chest, abdomen, back, head, and neck, not previously under thyroid treatment, with even more remarkable success.

These three investigations may be grouped together, so far as certain results are concerned; and I now propose to deal with the results *seriatim* as follows:—(*a*) pulse and temperature, (*b*) appetite and digestion, (*c*) bowels and urine, (*d*) weight, (*e*) blood (*f*) skin and hair, (*g*) mental effects.

(*a*) *Pulse and temperature.*—The character of the radial pulse, as judged by sphygmographic tracings, taken before and several times during treatment, has not yet been definitely determined. Schäfer and Oliver found increased blood pressure occurring after injection with extract of thyroid and suprarenal. We propose to investigate this matter further, as the tracings in our possession point rather to a lowering of blood pressure than increase. This they do in no decided manner; hence our reserve on the subject until a larger number of tracings has been obtained.

The value of sphygmographic tracings is considerably discounted by some, and in the case of the insane the discount may be larger, unless very great care is exercised in the selection of patients and the application of the sphygmograph. There can be no doubt, however, that spleen extract increases the frequency of the pulse-beat from 5 to 15 per cent., and raises the temperature a half to 1 degree in the great majority of cases. The most notable exceptions have been two cases of phthisis pulmonalis. In one case, which was rather advanced, the pulse and temperature were reduced for about a fortnight; while in another, still under treatment, and not so advanced, the reduction of pulse and temperature has been maintained for several weeks (at date of writing). In the first group of cases, the chronic mental cases, it was observed that the increase of pulse and temperature was only sustained for a week or two. The increased pulse-rate rather favours the idea of lowered arterial tension.

(*b*) *Appetite and digestion.*—In some the appetite was improved; in many more digestion improved without any relish for food. This is probably due to the fact that the liquid extract of spleen employed is rather nauseating to some; for in one case appetite as well as digestion were found to improve when tablets were substituted for the liquid extract. We have not found much objection made to the latter, however, and it is the preparation of which we have had most experience. The case of an old man may here be taken as an illustration. Two years ago he suffered from diffuse cellulitis of hand and arm, was reduced in condition by long drainage of pus, and nearly died. He has been in a very atonic state for many months, there being an entire want of appetite. All that time he was spoon-fed, and lost rather than gained weight, though taken in hand by a special nurse, who has been devoted to him. For the last month he has been on spleen extract, and still has to be fed for want of appetite; but he has gained 8½ lb., and his breath, which was intolerably fœtid, is now quite sweet. In some cases increased salivation has been noticed.

(*c*) *Bowels and urine.*—The evidence, so far, is not conclusive, and closer attention to this part of the subject is still required. In a few instances it appeared that the bowels were more active than formerly; in others, no change was observed.

(*d*) *Weight.*—The weight curves of twenty-four patients, who were systematically studied, were found to vary exceedingly. While rise of weight in some cases was phenomenal, in others it was very moderate. One positive fact came out clearly, namely, that increase of weight, however slight, was the rule, and the exceptions were very few. Many, especially females, showed only a moderate increase, the rise being 1, 2, and 3 lb. in six weeks. Others gained 14, 15, 17, and 31½ lb., in periods varying from ten to twenty-four weeks. Nine male patients increased an average of 8¾ lb. in an average of eight weeks, or a little over 1 lb. a week. Fifteen female patients averaged ·85 lb. a week. In those who afterwards recovered mentally a substantial gain was made. Four patients, one male and three females, lost. Of the females, one was phthisical, one was very fat (she improved mentally), and the third was in fairly good condition before spleen treatment was tried. The male case was a chronic adolescent, and also a masturbator, suffering from mitral disease.

(*e*) *Blood.*—The results have been rather inconclusive in the case of male patients, with two remarkable exceptions; but on the female side of the asylum positive improvement was more uniformly observed. Every case of the first two series was examined by means of the hæmoglobinometer and hæmacytometer (Gowers' method). In all the women, with one exception, there was slight increase of hæmoglobin and red blood cells. The exception showed, however, increase of red blood cells from 4,470,000 to 4,590,000 per c.mm., and the hæmoglobin remained at 80 per cent. This method of examination is not exhaustive, and, so far as it goes, is only approximate in its estimate. It takes no account of the composition of the blood plasma, or the actual volume of blood in circulation. That in most of the cases the blood was enriched—it may be temporarily only in some cases—as the result of improved digestion, goes without saying. In the female cases the blood was poorer to start with, hence the more manifest improvement in them.

(*f*) *Effect on skin and hair.*—Increased colour and warmth of skin has been noted, also softness and elasticity; in some a slight oily feel, in others a moist condition, due evidently to gentle perspiration. It is not merely a case of determination of blood to the skin; for it is quite clear that there is also an increase of secretory activity. The increased warmth probably accounts for the slight increase of axillary temperature. In almost all the cases the change in the face has been most noticeable; rubbing the skin of patients, who previously showed little or no reaction of any account, is followed by a glow of warmth and colour. Improved complexion was noticed in pale, cold, anæmic women, in women with dry, sallow skins, and in pale-faced men. No conclusion has yet been arrived at regarding the hair, for the reason that very little attention has been given to this subject until quite lately, but the results are rather positive and favourable than negative. In many of the chronic insane, and in some recent cases also, the hair becomes dry and harsh to the touch, like the fibres of a broom.

One such case treated by thyroid, and mentally *in statu quo* thereafter, recovered the gloss of her hair.

(*g*) *Mental effects.*—These will be best understood by studying some actual cases, here briefly described.

Case 1.—Female, single, æt. 37.—*Mental stupor and phthisis pulmonalis.*—During treatment she certainly looked somewhat more conscious, apparently took more notice of what went on around her, and on one occasion, just after getting out of bed, she slipped on the floor, exclaiming "Goodness gracious!" This was the only time she was ever heard to speak. Physically the benefit was only temporary, owing to the advanced stage of her disease.

Case 2.—Female, single, æt. 26.—*Mental stupor.*—She was first tried with thyroid tablets without any mental result, the dose being increased to twelve daily. Sickness, vomiting, and slight rise of pulse and temperature, were the only reactions. After the lapse of a month she was put on spleen, bodily but not mental improvement being the result. Thyroid was again tried, and its exhibition was followed by some constitutional disturbance, and distinct mental improvement, which was soon dissipated. Spleen extract (ether preparation) was then tried, with more decided physical and mental improvement as the result, but, after reaching a half-way stage of mental improvement, her condition remained stationary. Thyroid was now tried for the third time, and although it was not pushed to anything like the extent of previous attempts, reaction showed very quickly, and a very gratifying mental improvement was the result. She recovered her speech, talked with her friends and the nurses, her recollection of past events relating to her illness was very correct, and she wrote letters home. How long this might have lasted we cannot say. She died of intercurrent pulmonary and hepatic disease, but for which, we were disposed to think, she had turned the corner. Post-mortem examination of the brain made it appear doubtful, however, whether her mental recovery would have been lasting, owing to reduced consistence of white matter in certain areas. She had been insane for at least three years.

Case 3.—Male, single, æt. 20.—*Stupor.*—This lad was for months in a state of stupor, with brief glimpses of intelligence appearing for a day or two, and disappearing. *Case-book entry—1st October* 1896.—"Two days ago he was put on spleen treatment, and the same day there was considerable mental improvement. It is not supposed that it was due to spleen. 30*th October.*—The spleen treatment was stopped today; the patient is still keeping very well both bodily and mentally; his bowels are moving much better; he is taking his food himself, and apparently eating with relish; he is also gaining weight." A few weeks later he was discharged recovered, and has done well ever since. What the value of spleen treatment was here, one cannot say. Would the intelligence have become clouded as before, if spleen treatment had not been tried? This is a quite fair question, but unfortunately the answer is wanting.

Case 4.—Male, single, æt. 20.—*Stupor, second attack.*—Report of blood examination before treatment.—Red blood cells, 2,760,000 in each c.mm. Proportion of white to red, 1 to 39 (in the previous case before treatment, 1 to 12); hæmoglobin, 74 per cent. red cells of good size and shape; white cells irregular. He was in a cataleptic state, with bent head and drooping shoulders, never speaking or appearing to have any volition whatever. He seemed to be a mere automaton, which only moved when pushed. After being some weeks under spleen treatment, his blood was again examined, and the report is as follows:—Blood very much improved under spleen treatment. Corpuscles, 4,480,000 per c.mm.; proportion of white to red much as before; hæmoglobin, 84 per cent. There was a distinctly abnormal tendency to coagulation after the blood was withdrawn, which was also observed in a female case of stupor. In other observations this was not noticed, except to this extent that in some cases the red cells formed rouleaux.

Mental notes.—The first time his finger was pricked he did not flinch; he does now. He wakened up, stood when told to do so, smiled at a joke, and began to look around him, and make notes. This period lasted for some weeks, then he became irritable, and passed into a state of acute excitement which was quite maniacal. In this state he was aggressive and dangerous, talked in a blustering irrelevant fashion, and masturbated openly. Spleen treatment was then stopped, and now he ceased masturbating, and gradually subsided into a state of stupor, which was merely temporary, for he wakened up again, put on flesh rapidly, became an active and intelligent outdoor worker, and finally recovered, after being a year in the asylum. It may be suggested that spleen treatment caused sexual excitement, for masturbation ceased after it was stopped. For the present, however, this is mere conjecture. He was on spleen for over two months.

CASE 5.—Female, æt. 36.—*Puerperal.*—This was an extremely anæmic woman, who had a maniacal attack of several weeks' duration, and after it spent itself she was very weak, depressed, and without appetite or recuperative energy. Her case seemed a drifting and very unpromising one, when spleen treatment was tried. Under it her appetite returned, she gained steadily in weight, lost her cheerless expression, and made a good recovery in a little over a month from the commencement of this treatment.

CASE 6.—Female, æt. 23.—*Stupor.*—This patient, after an attack of hyperpyrexia, the history of which we do not know, became delirious, and then lapsed into a state of stolid, immobile stupor. When she came under treatment her complexion was swarthy, and her skin dry. In less than a week after being put on spleen treatment a deep rosy blush appeared on the cheeks, and the skin began to clear up; gradually the expression brightened, a light shone in her eyes, which previously were dull and lustreless. She began to look about, to do as she was told, to knit—slowly, it must be confessed—and to take her food. She has not progressed further in the last fortnight, but she has not gone back. Her case is quite a recent one.

It would serve no good purpose to burden this paper with more cases, or more lengthy descriptions. These are fair average examples of cases put under treatment, and we have records of over thirty more. Those quoted are neither the selected best nor the selected worst, and what they testify is that, by increasing nutritive activity alone, spleen treatment is a physiological factor of considerable importance in the treatment of mental disease. It would be premature to say that we have here a direct brain stimulant, for the data are still insufficient and may prove elusive; but there can be no question of this, that mental changes, sometimes of abnormal character, form striking incidents in the course of treatment. Exhibition of temper was quite noticeable in both sexes, but much more in the male sex; and it seemed as if in several male adolescents who had lapsed into stupor, spleen had a wakening influence, and roused spurts of excitement, it might be for only a moment, it might be, as in Case 4, distinctly prolonged and maniacal. Such another case as Case 4 is a young lad of 18, who was previously quiet, docile, stupid, and shy. Now he has changed to a positive condition of more activity, increased self-consciousness, with elevation of feeling; and he appears to be going further, for he is becoming aggressive, and may repeat the history of Case 4. Dr. Bois has observed that his pupils which were dilated and did not respond to light or accommodation, now respond to both. If his splenic outburst should end as happily as in the latter, and leave his brain purged of insane error and impulse, it will be a happy deliverance.

Treatment by thyroid extract, which was very extensively tried here before I thought of spleen extract, was not a success in mental cases. The patient certainly reacted in not a few instances, but the reaction was but a flash in the pan. It seemed to me that there was no reserve of *vis nervosa*, no potential energy to fall back on, and the feverish process induced in some cases might be described as "a last kick," without stamina to sustain it, and therefore futile. It cannot be doubted that spleen extract, if less phenomenal in its effects than thyroid, is conducive to more lasting results, that it is surer, and, still more important, exceedingly safe. Its most striking effect, perhaps, is on the skin; but its action direct and indirect is more than skin deep, and, though less obvious, is none the less sure. If thyroid treatment is proposed in any intractable mental case, I would strongly recommend a preparatory course of spleen to begin with. A warning is necessary, however. Spleen gives potential energy in abundance; it increases the susceptibility to thyroid, and much smaller doses of the latter are sufficient to induce pyrexia, or other constitutional disturbance, especially after the use of the *ethereal* extract.

THE PHYSIOLOGY OF THE SPLEEN.—The foregoing remarks would of themselves suggest the question, What is the physiology of the spleen? and it is to be regretted that this organ has so far eluded, to a considerable extent, the vigilant research of physiologists. If the average medical man were asked, What are the functions of the spleen? the almost certain reply would be, "Increase of white and destruction of red blood corpuscles." The physiological view, however, has recently been much enlarged, and the observations we have made clinically, confirm the importance of the modern physiological view. Without certain organs, life is impossible. This cannot be said of the spleen—for a time at least; but that it is essential to complete physiological life, even if its functions overlap like functions of other organs, is indisputable.

Many theories have obtained in the history of medicine, regarding the place of the spleen in the animal economy. According to Sir Richard Blackmore,[1] "Most of the old Fathers of Physick made it the Sink of the Body, and assigned to it the Duty of a Sponge to drink up impure Recrements, the melancholy Dregs and Lees of the Blood." In the preface to his work, the same writer observes that "The Extirpation of the Spleen, without any consequent Mischief, is an uncontested Matter of Fact down to this time from the Eldest Ages." Then he continues to argue that, though useless to the individual personally, it must have a function, and concludes that the spleen contributes to procreation.

It is not my purpose to discuss at length what is known of the physiology of the spleen, but I wish to recount some recent views of physiologists on the subject.

The volume of the spleen is subject to considerable variations. After a meal, the spleen increases in size, reaching its maximum about five hours after the taking of food; it remains swollen for some time, and then returns to its normal bulk. The turgescence of the spleen seems to be due to a relaxation, both of the small arteries and of the muscular tissue of the capsule, and of the trabeculæ; to be, in fact, a vascular dilation, accompanied by a local inhibition of the tonic contraction of the other plain muscular fibres entering into the structure of the organ, the latter, at all events in some animals, being probably the more important of the two. And the condition of the spleen, like that of other vascular areas, appears to be regulated by the central nervous system, the digestive turgescence being fairly comparable to the flushed condition of the pancreas and of the gastric membrane during their phases of activity.[2]

Regarding the movements of the spleen, the following notes are made from Schäfer.[3] Sabinsky (1867) showed that, after death from asphyxia, the spleen is constantly found in a contracted and anæmic condition. He came to the conclusion, as the result of his experiments, that this was not due to the direct action of asphyxial blood upon the organ, but that the effect was a reflex one, and dependent upon the integrity of the nerves to the organ.

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[1] "A Treatise on the Spleen and Vapours," 1725.

[2] Foster, "Text-book of Physiology," 5th edition.

[3] "Observations on the Contractility and Innervation of the Spleen," *Journ. Physiol.*, Cambridge and London, June 1896.

Schäfer has found that very minute doses of certain drugs and animal extracts cause an extraordinarily marked effect upon the rhythmic movements, and this, whether the drug, or extract in question, influences the blood pressure perceptibly or not. Even in an animal which is already curarised to the extent of completely paralysing the movements of the voluntary muscles, a very small additional dose of curari will produce a marked increase in the splenic rhythm, and this, both with the nerves intact, or with the nerves cut, or even with a glass tube connection of the organ in a peptonised animal. He states that the suprarenal extract produces contraction, and that even when injected directly into the artery of an excised and perfused spleen; and he therefore concludes that its action is peripheral. Extract of dried brain substance, made with boiling water or saline solution, injected in small quantity into the veins of the animal, produces an enormous increase in the extent of the rhythmic splenic movements. There is, however, a fall in blood pressure, the opposite of what is obtained with extract of the pituitary body. The two, however, produce the same effect on the normal rhythmic movements. Reactions are obtained also from boiling water made from the submaxillary and parotid glands of the dog. Schäfer adds: "We have obtained somewhat similar results to those got from submaxillary and parotid with extracts of pancreas and liver; while many other animal tissues have yielded no result. There can be no question that these effects are specific, seeing that they are not obtained with even much larger doses of certain glands and extracts, nor with normal saline solution."

Dyspnœa produces under normal conditions a marked contraction of the spleen, the result of asphyxia, and the like result is obtained when there is an arrest or diminution of the flow of blood to the spleen. The nervous connections of the spleen have been pretty well made out from experiments on the dog and cat, and in them the spinal root connection is very extensive, embracing fibres from very nearly the whole thoracic-lumbar sympathetic outflow. The muscular tissue is innervated from the third to the fourteenth post-cervical inclusive, the largest outflow occurring from the fifth to the ninth. The outflow in each pair is larger in the left side; it is not bilaterally symmetrical. The outflowing fibres probably have a cell connection in the main ganglionic chain of the sympathetic, and perhaps another in the semilunar ganglion. This conclusion is the result of a study of the effects of intravenous injections of nicotine.

It is known also (Foster) that a rapid contraction of the spleen may be brought about in a reflex manner by stimulation of the central end of a sensory nerve, or directly by stimulation of the medulla oblongata with a galvanic current. The nervous relations of the spleen are therefore of wide distribution, and when we consider that on its size and movements depend the amount of blood let loose in the splenic pulp, and the amount of metabolism taking place there, the exercise of abnormal nervous influence may be serious.

Much has yet to be done in working out the physiological chemistry of the spleen, but enough is known to enable us to conclude that spleen metabolism is a function of very great importance. The organ is exceedingly rich in extractives, and in certain inorganic salts, soda, and phosphates. The proteids of the thyroid and spleen have been studied by Frederick Gourlay.[1] The only proteid that he has obtained in the thyroid is a nucleo-albumin from the so-called colloid matter in the acini. He suggested, with all reserve, that the nucleo-albumin is the material to which the thyroid treatment of myxœdema owes its usefulness. Robert Hutchison has since stated,[2] as the result of his researches, that the proteids are two, a nucleo-albumin and the colloid matter, and that the latter is the active ingredient of the thyroid. Gourlay finds that the spleen contains two proteids, a globulin and a nucleo-albumin. The latter, like that obtained from other cellular organs, produces, when injected into the circulation of rabbits, intravascular coagulation.

I have entered at considerable length into the physiology of the spleen, in order to show how widespread are its nervous connections, how sensitive it is to a variety of stimuli, how important its functions must be, and how easily these functions may be checked or diminished by changes in the blood, and by nervous influences. It is exceedingly probable, therefore, that mental causes affect the integrity of the splenic function.

WEIGHT OF SPLEEN IN THE INSANE.—An observation extending over several years, of the smallness of this organ in many of the insane, led me to make inquiries outside asylums. It was desirable to make sure that the spleen weights given in the text-books (5 to 6 oz.) were correct. Reference to the pathological records of the Glasgow Royal Infirmary, and a comparison with the weights recorded post-mortem in three different asylums, showed an average difference of about 1¼ oz. in weight.

It is well known that the spleen is an elastic as well as a contractile organ, with great distensible capacity. Therefore we are not surprised to find that, in cases of cardiac incompetence, and other conditions giving rise to venous turgescence, the spleen weight, post-mortem, should count for nothing as an indication of its working weight. Moreover, the spleen itself may be diseased. Further, in the Infirmary statistics were found small weights, as in the asylum reports; but they were not nearly so numerous. The weight results noted are quite in accordance with the opinion already expressed, that mental causes may induce contraction of the volume of the spleen, and reduce its range of functional activity by limitation of the blood supply to the splenic pulp. This does not narrow the mental factor, or include merely the mental disturbance of insanity. The emotional disturbance which affects perfectly sane people will also, by direct nervous outflow, tell upon the spleen; and the wards of our hospitals must necessarily contain many sufferers of this kind.

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[1] *Journ. Physiol.*, Cambridge and London, March 1894.

[2] *Brit. Med. Journ.*, London, March 21, 1896.

Of eighty-three spleens weighed in asylums, twenty were 2¾ oz. or under (some being only 1½ oz.), twenty were under 3¾ oz., 14 were under 4½ oz. Of the remaining twenty-nine, the weights ranged from 4¾ to 10 oz.

Of fifty spleens weighed in the Infirmary, five were 2¾ oz. or under, three were 3¾ oz. or under, six were under 4½ oz., and thirty-six weighed from 4¾ to 13½ oz.

Of course, Infirmary and asylum figures cannot be rigidly compared with each other, or with those of the general community, if such comparison were possible. It is well, however, to point out that, in sixty-three consecutive asylum post-mortem examinations, the heart was found diseased, though not necessarily incompetent, in thirty-five.

SPLEEN EXTRACT PREPARATIONS AND DOSES.—Before referring to the methods and preparations employed, I wish cordially to acknowledge the valuable assistance rendered me in this and other parts of the work by Dr. T. Alf. Beadle, until recently senior assistant medical officer of the Asylum.

Fresh bullock spleen was employed, and our first preparation was made as follows:—Fresh spleen, freed as much from its capsule as possible, was chopped, and beaten into pulp in a jar. A liquid extract was obtained by adding a 10 per cent. solution of chloride of sodium, and a 10 per cent. solution of glycerin. This was allowed to stand for two or three days, with occasional shaking, and then squeezed through several layers of fine muslin.

The next method was an improvement. The saline solution was reduced in strength, and 20 per cent. sp. vini rect. was substituted for glycerin.

It was found, however, that a certain small residuum was not taken up in this way, and that it was fatty in appearance. This was obtained separately by ether extraction.

The private preparation of the extract had to be conducted weekly, in order to have it fresh, especially in warm weather, as spleen decomposes quickly. This was kept up for over a year, Dr. Beadle doing the lion's share of the work. At the end of that time I communicated with Messrs. Duncan, Flockhart, & Co., Edinburgh, and gave them the methods employed here. Since then we have been supplied by them weekly with fluid extract of spleen, freshly prepared, and in a rather more palatable form than we were able to make ourselves. An extract may, however, be had in four forms:

(*a*) Compressed tablets—ext. of spleen (exsic.), each = 15 grs. fresh spleen.
(*b*) „ „ „ „ (precip.), „ = 30 „ „ „
(*c*) Emulsion of ether ext. of spleen, each fluid drm. = 5 grs. of extract.
(*d*) Fluid extract of spleen, 1 drm. = 1 drm. fresh spleen.

The last (*d*) is what we have mostly used, as it is freshly prepared weekly, and by a less expensive process than the emulsion; but further investigation is necessary to demonstrate how much the one lacks what the other possesses. A more extended trial with tablets is also desirable. Spleen tabloids, each representing 5 grs. of fresh spleen, may be obtained from Messrs. Burroughs, Wellcome, & Co.

Doses.—As the emulsion is probably more potent than any of the other forms, care should be exercised in giving it. The largest dose I have given was 1 drm. four times a day, and no bad effects were observed. From the small quantity obtained of this preparation, we were only able to give it to two female patients, who benefited physically, reacting, so far as skin and digestion were concerned, like the other cases.

Of the fluid extract, we now give from three to four tablespoonfuls a day; but for a long time we proceeded cautiously, with one, two, or three teaspoonfuls, three or four times a day. There was no occasion for anxiety or alarm from first to last. Nothing toxic has, so far, been noticed in the action of this remedy, but I would repeat, the ethereal extract should still be tried very cautiously.

Into the history of spleen treatment I must forbear to enter. At the best, it is very meagre, though fugitive observations have from time to time been made in medical journals. The fact that excision of the human spleen has been performed, with apparently no physiological loss to the individual, would rather discourage one from entering on an investigation of the subject. The teaching of modern science proves, however, that nature is lavish in her provision of material, and in her reduplication of functions, exclusiveness of function being the exception rather than the rule. But we may infer with perfect confidence, that a man without his spleen is distinctly a lame man in a physiological sense, as well as in an anatomical. Further investigation of the subject will establish more strongly the physiological value of the spleen, and, in the case of animals, its intrinsic merit as a therapeutic agent.

REMARKS ON A CASE OF PORENCEPHALY.

By G. A. Gibson, M.D., D.Sc., F.R.C.P.Ed., *Senior Assistant Physician, Royal Infirmary, Edinburgh*; and W. Aldren Turner, M.D., F.R.C.P. Lond., *Physician to the Hospital for Epilepsy and Paralysis, and Assistant Physician, West London Hospital.*

(Plates IV.–VI.)

Amongst the pathological conditions giving rise to infantile hemiplegia, those attended by atrophic processes affecting the cerebrum possess deep interest, on account of the difficulties surrounding their causation. Every case belonging to this category is worthy of attention, since it may, even if not giving definite facts of etiological value, aid in the comprehension of the conditions in which it is likely to arise. The circumstances in which the illness of the patient, whose case is about to be recorded, arose, are of value as leading to inferences in regard to the probable causes of the disease, although no real information is to be obtained of a pathological kind.

Clinical features.—J. F., æt. 22, engaged in household occupations at her parents' home, was admitted to the Deaconess Hospital on the recommendation of Dr. Veitch, on 27th January 1895, on account of severe epileptic convulsions. Both of the patient's parents were alive and well, as were also all the members of the family. At the time of her birth they belonged to the well-to-do artisan class, but at the time of the patient's admission to the hospital they had sunk, from various causes which it is unnecessary to specify, into a condition approaching destitution. Apparently the illness for which the patient was admitted, dated from birth. The labour had been a somewhat tedious and very difficult process, and delivery had been effected by instrumental aid, leading to some damage to the patient's head.

Three days after her birth the child is said to have looked nervous, whatever that may mean at such a tender age, and to have been attacked by convulsions, which continued for three days. The motor disturbance was almost entirely confined to the left side. After the convulsions had passed away, the child seemed to progress favourably; but by and by it was observed that, when she began to touch objects, the left hand was paralysed. Her mother had no doubt that the paralytic condition had persisted unnoticed from shortly after the birth of the child. The child appeared to be remarkably healthy, and was rather plump. It was, however, observed that she did not attempt to walk at the usual age; indeed, no progress in that direction was made until she was between 3 and 4 years of age. At this period her mother had her attention directed to a want of symmetry in the shape of the skull.

When somewhere about the age of 7, the patient was sent to school, where she learnt without any great difficulty to read and to spell. Writing, however, she was never able to learn, being only able to copy letters and words when her hand was guided. Her hearing and sight

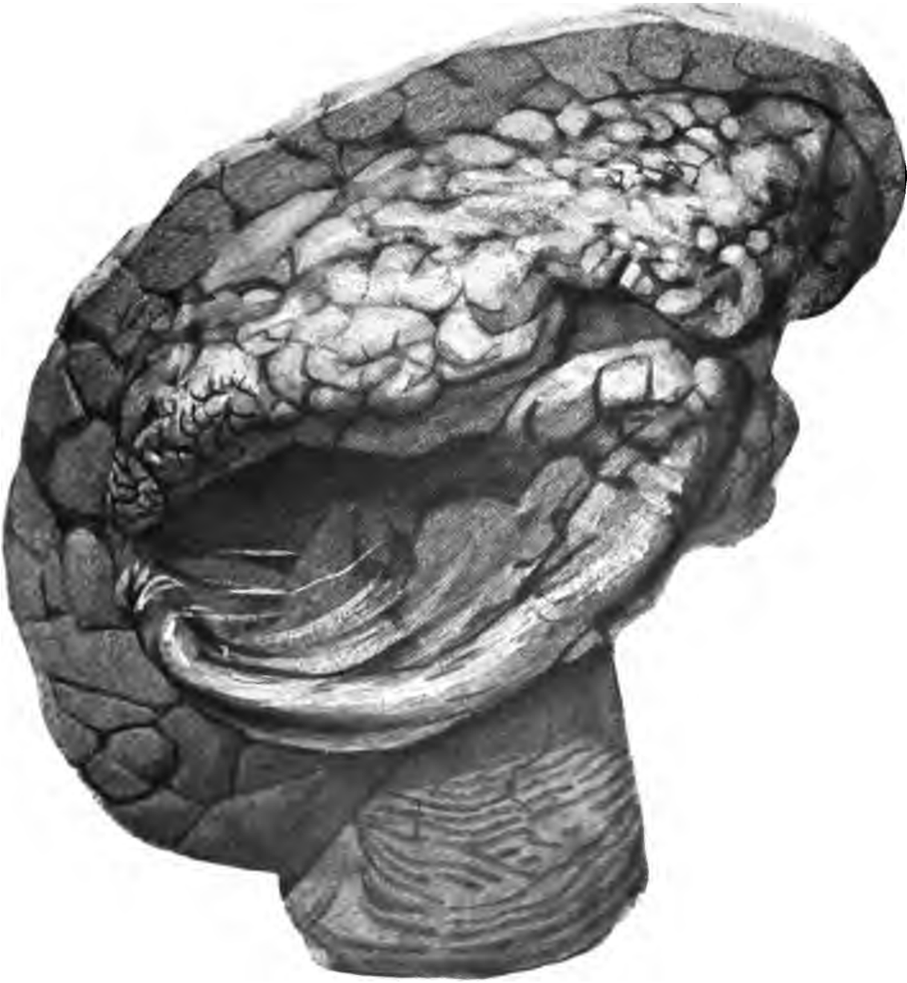
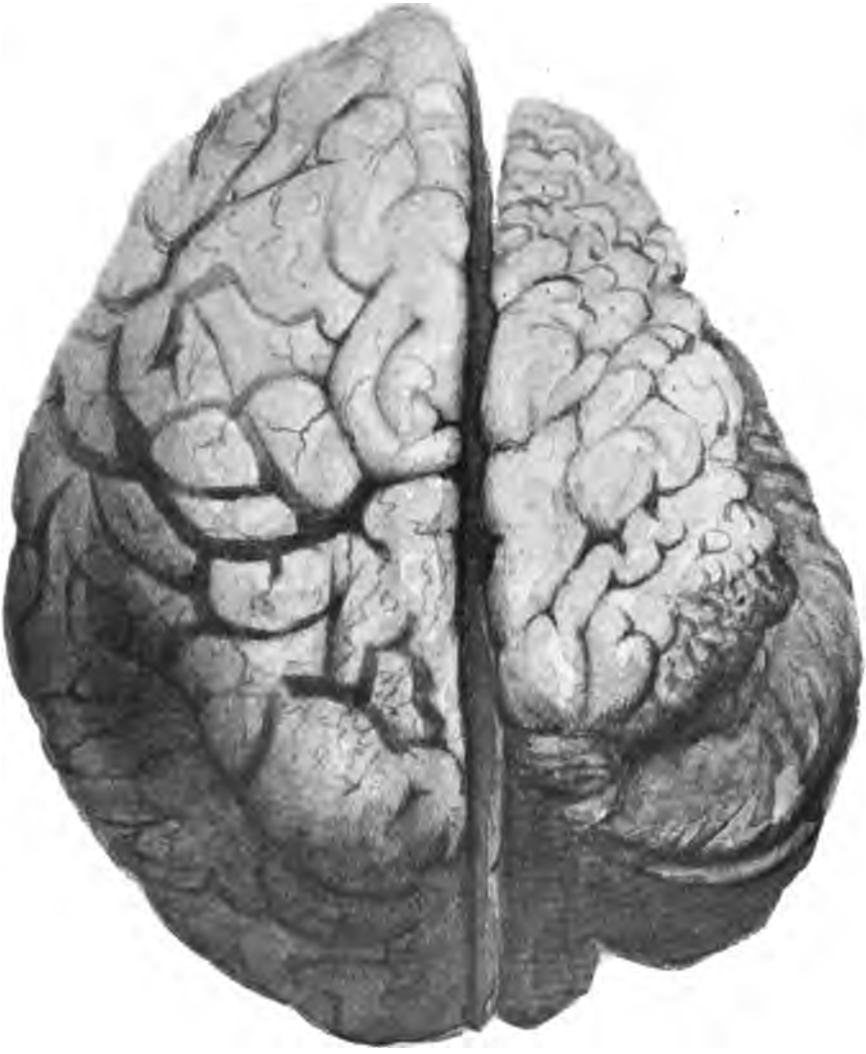
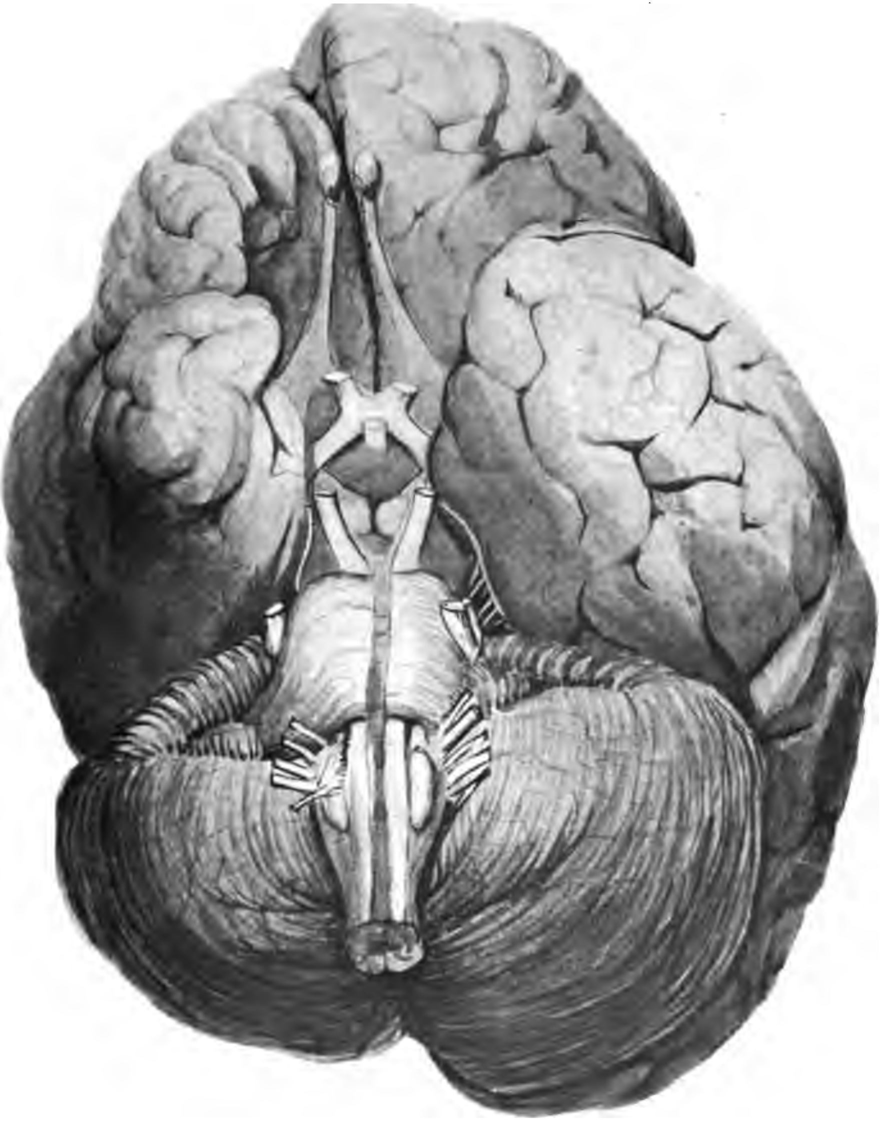


PLATE V





were always perfect. She had always been of a nervous and excitable nature. It was very easy to produce in her a condition of extreme irritability. Her memory, singularly enough, was retentive, and her speech was entirely unaltered. Shortly after being sent to school she began to suffer from convulsions, which gradually increased in number and frequency.

She left school æt. 14, and since then had always been employed in her parents' house. During the eight years elapsing between her leaving school and the date of her entrance into the Deaconess Hospital, her behaviour was such as might be expected from a child of 7 or 8 years; but immediately after any of her epileptic fits she became somewhat outrageous, and appeared, indeed, to be almost insane. The patient was admitted to the hospital on the evening of 27th January 1895, and, the same night, Dr. Cattanach, then Resident Medical Officer at the hospital, called in order to state that a patient had been admitted in a *status epilepticus.* Thinking that it might be an example of some condition that might be relieved by surgical intervention, we called on Mr. Alexis Thomson, and all proceeded to the hospital together. The patient when seen by us was passing through a series of profound epileptic convulsions, and was absolutely unconscious. The chief peculiarity of the convulsions lay in the fact that each was confined to half of the body, and they occurred approximately in such an order that two convulsions involving the left, were followed by one confined to the right, side of the body, and so on. Each convulsion set in with a tonic spasm of all the muscles of the one side, and at the same time the bilaterally innervated muscles of both sides of the face were thrown into a tonic spasm. The head was invariably turned away from the side on which the convulsions were seen. During the spasm the patient became deeply cyanotic, the face being livid, the lips bluish black, and the veins of the neck turgid. After the lapse of a few seconds after the onset of the tonic spasm, all the muscles which had been affected by rigidity passed into clonic convulsions. During the clonic spasms, the patient threw the arm and leg on the affected side wildly about, and champed with her teeth; but, so far as could be observed, did not damage her tongue. It was impossible, on account of the comatose state and the frequency of the attacks, to make an exhaustive examination of the condition, and no facts could be elicited as to the sensibility and reflexes. The state of the pupils varied considerably, and there were wild movements of the eyeballs. The respiration was much interfered with by the convulsions, and there was involuntary evacuation of the urine. None of this could be collected, so its condition was not ascertained.

Various remedies were tried in order to curb the severity of the attack, but even deep anæsthesia, from chloroform inhalation, had little effect. It was obvious that the patient's end was drawing near, and she died in a state of exhaustion at two o'clock A.M. next morning.

Morbid anatomy.—At the post-mortem examination it was found that the patient was 4 ft. 10 in. in height, quite plump, and well nourished. Muscular rigidity was well marked. Careful measurements were made of the extremities. In length the extremities were exactly equal; but on account of talipes equinovarus of the left foot, measurements were only recorded of the femora and fibulæ, as well as of the humeri and ulnæ. These, thrown into a tabular form, were, in inches:—

	Right.	Left.
Humeri . . .	12½	12½
Ulnæ . . .	9	9
Femora . . .	16	16
Fibulæ . . .	13	13

The circumference of the different parts of the extremities were as follows:—

	Right.	Left.
Arm . . .	9½	9¼
Forearm . .	8¼	8
Thigh . . .	17¼	17
Leg . . .	9	8

The left half of the head was distinctly larger than the right.

Permission was only granted to examine the brain. On reflecting the scalp, it was very obvious that there was a difference in the size of the two halves of the skull, the left being considerably larger than the right. They measured respectively 10 in. and 7¾ in. On removing the calvaria, it was found that the frontal sinuses were very large. The skull itself was somewhat thin. After the brain had been removed, it was seen that the floor of the anterior fossa was somewhat convex, with a deep fissure on each side of the crista. There was comparatively little change in the form of the anterior fossæ, their measurements showing no difference in size. It was otherwise, however, with the middle and posterior fossæ, those of the left side being much larger than those of the right. On measuring the middle fossæ diagonally in their longest dimensions, that of the left side was 2½ in., while that of the right was 2 in. in length. Transversely across, the measurements were 1¾ in. on the left, and 1½ in. on the right side. The measurements of the posterior fossæ in the longest diameters showed that the left was 2½ in., while the right was 2 in. The only other point calling for mention was that around the foramen magnum there was a very distinct ridge, with a large protuberance in front towards the left side.

Pathological conditions.—The difference in size and development between the two hemispheres is well seen in the pictures, which are reproduced from drawings by Mr. J. T. Murray. The *right hemisphere*, after hardening in Muller's fluid, weighed 5¾ oz. It was partly cystic and partly solid; the cystic portion consisting of the occipital lobe, the convolutions around the posterior end of the fissure of Sylvius, and the ventral part of the temporo-sphenoidal lobe (Plate IV.).

As regards convolutionary development, the gyri over the cystic portion were absolutely atrophied, their place being taken by a dense layer of fibrous tissue, which formed the outer wall of the cavity. The convolutionary areas, which showed the least amount of atrophy, were the gyrus fornicatus, the tip of the temporo-sphenoidal lobe, and the paracentral lobule on the mesial aspect

The remainder of the brain, both mesially and on the convexity, presented a curiously shrivelled appearance (Plate V.), the convolutions being here seen in miniature. The basal ganglia were present, but considerably atrophied. The cavity was lined by a smooth-walled membrane.

It will be seen from this description, and from a consideration of the figures, that although the whole of the right hemisphere is atrophied, that portion which is cystic, and over which the convolutions are entirely absent, marks the distribution of the branches of the posterior cerebral artery; we would, therefore, argue that the primary lesion, probably of a thrombotic nature, occcurred in that vessel; and that, although neither the anterior nor middle cerebral arteries entirely escaped, the vascular obstruction was less than that which occurred in the posterior artery.

Examination of the cerebellum and hind brain showed that the *left* cerebellar hemisphere was considerably atrophied in all dimensions. This observation is in harmony with what has been constantly described, namely, a crossed cerebello-cerebral connection, by way of both the superior and middle cerebellar peduncles, that by the superior peduncle being the more direct; as recent observation appears to favour a direct cortical continuation of the superior peduncular fibres. The picture of the base of the brain (Plate VI.) does not bring this fact out. In consequence of the extreme atrophy of the right half of the cerebrum, the cerebellar hemisphere of that side projected upwards to such an extent that its form was altered, and its apparent size, looked at from below, was much smaller than it should have been.

A detailed microscopic investigation of the pons and medulla oblongata was not carried out, but those sections examined showed a partial atrophy of the mesial or chief fillet, on the right side; the portion least implicated being the most internal of the fibres of this structure—the so-called *pes lemnisci.* These sections, therefore, support the view which is now generally accepted, that the mesial fillet ends partly in the optic thalamus, and is partly continued directly onwards to the cortex cerebri; the retention of a considerable degree of fillet formation being in this case accounted for by the presence of the basal ganglia, chiefly the optic thalamus, in a fair state of development. There was dartial atrophy of the right pyramidal tract.

The brain here figured and described is a good example of the condition called *Porencephaly*, by Heschl,[1] Kundrat,[2] and Otto,[3] in which the cortical defect is in direct association with the lateral ventricle. This is the most advanced pathological condition met with in infantile spastic hemiplegia; all degrees being obtained from this downwards through cystic formation, cortical sclerosis, and local softenings, to limited convolutionary atrophy (microgyria).

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[1] *Präger Vrtljschr. f. prakt. Pharmakol.*, 1859 and 1868; *Jahrb. f. Kinderh.*, Leipzig, Bd. xv.; *Arch. d. k. k. Ges. d. Aerzte*, Wien, 1878.

[2] "Die Porencephalie," Graz, 1882.

[3] *Arch. f. Psychiat.*, Berlin, Bd. xvi.

Various views have been propounded as to the causation of this condition, but that most favourably received, and which fits the case under consideration most nearly, is a thrombotic occlusion of a cerebral artery, with secondary softening and cystic formation. In this case, though the entire cerebral hemisphere is atrophied, it would appear that the posterior cerebral artery was that chiefly implicated. That this may take place before birth seems highly probable in some cases. The history in our case clearly points to the onset three days after birth, when the child was seized by convulsions; and the conditions in which the first clinical appearances were developed seem in favour of thrombosis rather than of embolism as the cause of such vascular occlusion, as was first seen by Heubner.[1]

The subsequent onset of epilepsy in such cases is invariable.

ON THE TREATMENT OF SOME OF THE MORE COMMON EYE AFFECTIONS.

By G. A. Berry, M.B., F.R.C.S.Ed., *University Lecturer on Ophthalmology; Ophthalmic Surgeon, Royal Infirmary, Edinburgh.*

(*Continued from page* 60.)

The treatment suitable in cases of cicatricial ectropion is, as we have seen, influenced by the fact that the eversion of the lid is due to more or less extensive loss of surrounding skin. The operations which have been recommended as applicable in conjunctival ectropion are therefore rarely of use here. They can only be employed in the comparatively slight degrees of cicatricial eversion. Snellen's thread operation, though it may lead to an improvement in such cases, is never particularly satisfactory, as the turning in of the eyelid conjunctiva is then got at the expense of the position of the lid in another respect; it is always too far withdrawn from the eye, which generally causes an unsightly appearance. Removal of a wedge-shaped portion from the lid, on the other hand, sometimes gives quite good results. In cicatricial ectropion, however, the wedge should be removed from the portion which shows the greatest amount of eversion. This may be any part. Often it is the middle of the lid.

As a rule, and whenever the eversion is at all marked, it becomes necessary to perform a plastic operation. The portion of skin which has to be transplanted may be taken from some part in the neighbourhood—from the cheek, the forehead, the temple, the side of the nose, or, in the case of cicatricial ectropion, of the lower lid, even from the upper lid. In all these cases the flap taken should, of course, be a pedicled one. Sometimes, owing to the absence of any sound skin from which to secure a pedicled graft, a piece of skin completely detached from some other part of the body, preferably the arm or leg, may be used as a graft. This proceeding has the inconvenience that, although the transplanted skin always, with proper care, retains its vitality, and becomes adherent in the gap to which it has been transferred, it has, nevertheless, an invariable tendency to shrink subsequently to a considerable extent. Often this shrinking is so great, that, notwithstanding that the graft has been taken originally a great deal larger than required to make up for the lost skin, the effect of the operation is gradually practically reduced to little or nothing. After a large experience of such operations, I am convinced that they should never be undertaken except where it is quite impossible to get a flap from any part of the face. The patient should then not be encouraged to expect too much. As there is no local loss of substance resulting from failure in such transplantations, there is always the possibility of repeating them. Indeed, it is usually necessary to do so once or twice, to get a fairly good permanent result. The main points to be attended to in making a large skin graft from a distance are—to secure asepsis in both wound and graft, to avoid interfering too much with the graft, to remove all fat from the skin to be grafted, also any blood clot from between it and the wound, to cut the graft sufficiently large, and to allow the first dressing to remain for several days without being changed.

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[1] *Wien. med. Bl.*, 1883.

The first step in the operation should be the freeing of the traction which causes the eversion of the conjunctiva. An incision is made in the skin or cicatricial tissue, parallel with the whole extent of the lid margin and close up to it. This is continued in depth with the knife or with a pair of scissors, so as to form a flap composed of the conjunctiva and lid margin. This flap is freed sufficiently to enable the conjunctiva to be easily held in its proper position and turned towards the eye. Three horse-hair loop stitches are then passed through the margins of the upper and lower lids, and the free ends knotted on the lid which is not the site of the operation. This secures the retention of the flap in its proper place, and also fairly well the desired immobility. A gaping wound is thus left, which has to be filled with the graft. Before, however, cutting the graft, a suture may be placed at each angle, and also one or two through the upper edge of this wound, ready to be used for keeping the graft in position. By doing this any bleeding at the time of placing the graft is avoided. The graft itself is next cut, and of a size at least half as big again as the gaping wound it has to fill. It is best to remove the skin with the underlying fat. This can be done quickly and more satisfactorily than dissecting it free from fat. The fat is afterwards removed from the excised portion of skin, which is then ready to be placed in position. By the time it is ready, the wound, on which a compress dipped in corrosive solution has been meantime held by an assistant, has usually stopped bleeding. The free ends of the sutures, which have been placed at points surrounding the wound, are then carried through corresponding parts of the edge of the graft, and knotted. These are usually sufficient to hold the graft in its place, but it is well to further secure it against risk of displacement by means of strips of fine court plaster. The whole may then be covered by a piece of ordinary protective, powdered well over, and especially at its margins, with iodoform. A good large pad of absorbent cotton and a bandage complete the dressing, which is not disturbed for three or four days.

The great advantage which a pedicled flap taken from the neighbourhood has over a graft from a distance is, that it shows little or no tendency to shrink subsequently. When a plastic operation of this nature is properly performed, the flap always retains its vitality. The one objection which might be made is that a scar is necessarily left at some previously more or less normal part of the surrounding skin. This scar should, however, always be linear, and is then not by any means so unsightly a deformity as that which calls for operative interference. It is important, however, to give quite as much care to the stitching up of the wound from which the flap is taken as to the stitching of the flap itself into the gap which it has to fill up. Tension must, of course, be avoided, and this is best done by freely undermining the skin before stitching.

I have discussed the merits of many of the numerous different operations which have been suggested in my lectures on eye operations. In this connection it is not necessary to do more than to refer to some of the practical points which require attention in all plastic operations of this kind. The operation must be done antiseptically; the ectropion must be reduced completely before the flap is cut, and this either by an incision close to and parallel with the lid border, as already described, or in continuity with a flap, beginning from incisions made at a greater distance from the margin, according to the operation which it is proposed to do. After this the lids should be temporarily sutured together. The flap must be cut sufficiently thick, and the pedicle be sufficiently broad. If, after cutting it, it should turn out to be rather short, it is better to get the remaining length required, from another place if possible, than to risk narrowing the base. If this is not possible, it may be lengthened by undermining the skin at its base. Especially when operating for cicatricial ectropion of the lower lid, care should be taken that the depth of the skin-flap is sufficiently great at the inner angle. Finally, the flap should be very carefully stitched to the edges of the gap to be filled, by a large number of sutures. The dressing should be the same as that described above, and should remain undisturbed for the same length of time.

A particular form of cicatricial partial ectropion of the lower lid is often met with. This is caused by a tacking down of the superjacent tissues to some portion of the malar bone, which has been the site of a tubercular caries. In such cases I have found it best to circumscribe by an incision the portion of ulcerated skin or cicatrix which is adherent to the bone. Then undermining the surrounding skin in all directions, but most freely upwards in the direction of the lid, so as to free the ectropion, the wound thus caused may be readily closed, while at the same time the temporary union of upper and lower lids maintains the previously everted portion of the latter in good position. This is better than making an attempt to liberate the puckered skin from the bone, which is not only often difficult to do without buttonholing it, but which almost invariably leads to failure from reattachment.

ENTROPION AND TRICHIASIS.—From the points of view of both etiology and treatment, two forms of entropion may be distinguished. The entropion may be purely spasmodic. This variety is confined to the lower lid, and is practically only met with in old people. The skin of the lid is wrinkled and flaccid, or redundant, in comparison with the layer of palpebral orbicularis muscle-fibres below it. Any irritation which leads to repeated contraction of these fibres causes the skin and the eyelash border to roll inwards. The eyelashes, by rubbing against the eye, further irritate and lead to the keeping up of the spasm which maintains the entropion.

The treatment of spasmodic entropion must be directed both towards mechanically counteracting the inversion of the lid and removing the irritation which leads to the frequent forcible orbicularis contractions. In a number of cases, and particularly in those in which there is only a temporary source of irritation, as after a cataract or other operation, all that is necessary is to reduce the inversion with the finger, and, after carefully drying the skin, paint on collodion. The lid must of course be held down, and should indeed be held somewhat everted, until a sufficiently thick layer of the collodion has had time to dry, and thus keep up the mechanical effect. This treatment may be tried, before resorting to anything more radical, in all cases which have not lasted very long, and in which the lid has not, as it were, got a set in the inverted position. The collodion has frequently to be reapplied—at least once daily, this depending upon the extent to which the layer becomes softened by overflowing tears. At the same time the local irritation should be allayed by frequently bathing the eye with warm boracic acid lotion, and afterwards dropping in a solution of cocaine. For this purpose a freshly-prepared solution of cocaine in almond oil is useful. The following prescription may be recommended:—

℞	Cocainæ . . .	grs. 5
	Olei amygd. . . .	ʒij

Dark glasses should also be worn, and reading or writing disallowed for some days.

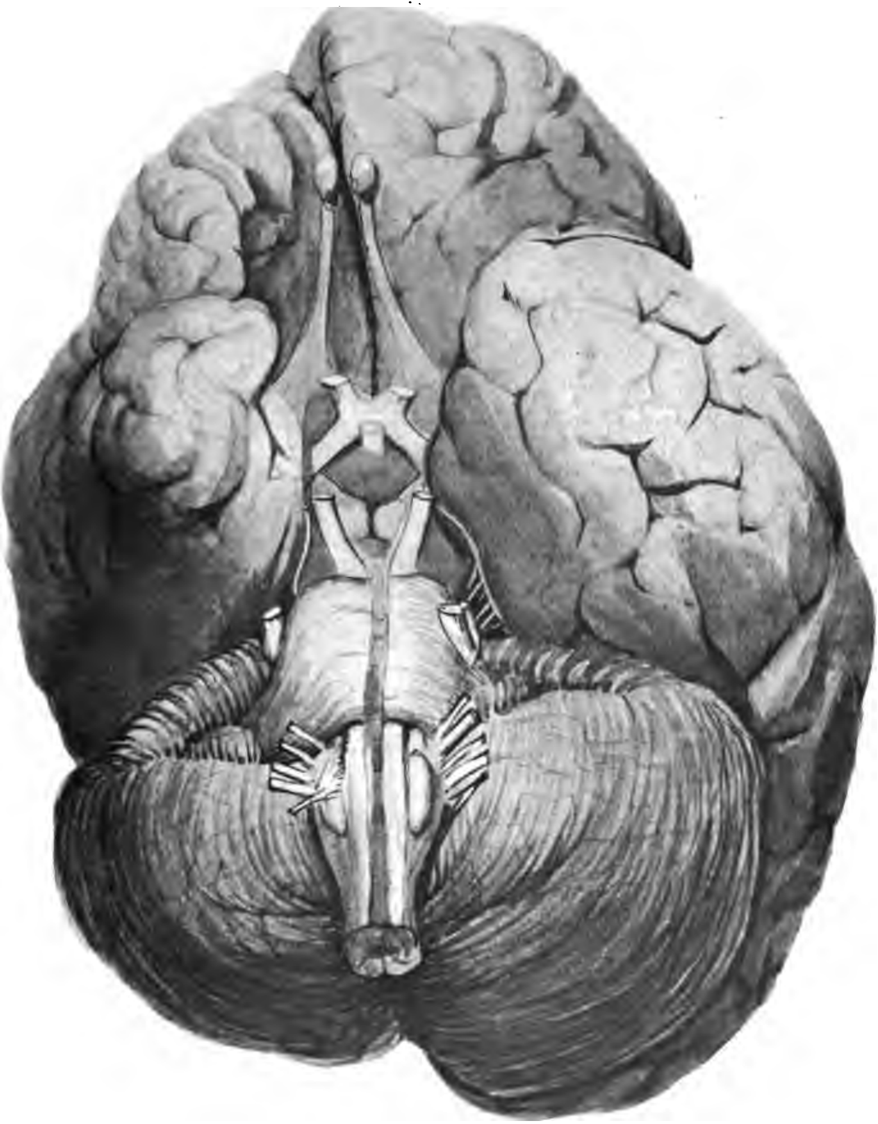
Although the collodion treatment is often successful in earlier cases, there is in many a tendency to relapse. In many, again, the treatment fails to give even temporary relief. Recourse must then be had either to one or other of the two thread operations about to be described, or to excision of a piece of the redundant lid skin. The most commonly employed thread operation is known as Gaillard's. This consists simply of passing three or more loops of thread beneath the skin of the lid, and knotting them on pieces of drainage tubing at a greater or less distance down the cheek. One end of a thread, which must be aseptic, is entered immediately below the lid margin, and passed downwards for an inch or so below the skin towards the cheek before being brought out. The other end is entered in the same way, close to the first. This forms a loop. The three or four loops thus placed close to the lid margin are then knotted. They may be allowed to remain as long as they do not produce too much irritation, and the tracks they form are afterwards replaced by cicatricial bands, which render the mechanical effect permanent. This little operation is both simple and efficacious. It has the disadvantage, however, of leading to a somewhat unsightly fold of the skin of the lid.

Another thread operation which may be substituted for it on this account, and which is also more suitable in cases in which there is no marked redundancy of skin, is the following:—Two or three loops are formed at the bottom of the conjunctival sac, by passing the two ends of each thread, parallel to each other and close together, from the bottom of the sac upwards underneath the skin, and out immediately external to the lid border, where they are tightly knotted together. For ordinary senile entropion, however, there is no more immediate and satisfactory cure than the excision of a portion of the lid skin. The thread operations need only be resorted to when, as is pretty often the case, the patient is averse to any cutting. When properly done, the removal of skin leads to a permanent rectification of the lid inversion. The only difficulty in the proceeding is to make sure of excising just the right amount of skin. If too little be taken, the entropion, though not as great, may be quite as troublesome as before, and an excision of too large a piece will convert the condition into a more or less unsightly ectropion. On the whole, it is better to err on the side of removing too much than too little. At all events, the patient will usually be better pleased. A slight degree of ectropion, amounting as it does in such cases to little more than a withdrawal of the lid margin from the eye, is of little consequence, provided always there is no decided eversion of the punctum lachrymale. It is well, therefore, to take care not to include too large a piece of skin to the inner end of the lid in the portion excised. The upper limit of the excised portion should come close to the lid margin, except to the inner side, where it should curve away from it, in order to get the best effect. After the slight bleeding has been stopped by pressure, the edges of the wound should be brought together by three or four sutures. The dressing (protective, iodoform, cotton-wool) may be changed after forty-eight hours, the stitches removed, and the linear scar covered by a piece of court plaster. The scar eventually left is quite unnoticeable.

The other common variety of entropion is the cicatricial. Cicatrices in the conjunctiva, and shrinking of the subconjunctival tissues generally, lead to inversion. The cicatrices may be the result of both accident and inflammation, and this form of entropion is equally frequent in both upper and lower lids, and on the whole more troublesome in the former. The most frequent cause of cicatricial entropion is trachoma. There is then also trichiasis, or misdirection inwards of the eyelashes. The rubbing of the eyelashes against the eye is not only a source of great irritation, but leads always more or less to an aggravation of the corneal inflammation which is so often associated with trachoma.

The main aim, therefore, in operations for cicatricial entropion is to remove the trichiasis. To do this without sacrificing the eyelashes, it is necessary to transplant the lid margin. Many different methods of doing this have been practised, few of which can be said to be completely satisfactory, and to fully secure the patient against recurrence as the cicatricial contractions become more and more pronounced. With few and unimportant exceptions, the various methods in vogue may be divided into two classes. In the one, a transplantation is effected by merely loosening the connection between the cilia-carrying border of the lid and the subjacent tissues, and sliding the bridge thus formed upwards, at the same time securing its reattachment in the altered position by suitably placed sutures. In the other, an attempt is made, in addition, to cover the tissues from which this strip or bridge is displaced with a pedicled skin-flap from the lid itself, or with a piece of skin or mucous membrane taken from a distance.

From my own experience of operations for cicatricial entropion, I believe most of the methods which have been advocated are capable of giving fairly satisfactory results. They are, however, in my opinion, not equally suitable in all cases. For instance, the transplantation of a pedicled piece of skin to fill up the space left



having escaped injury, the lid should be frequently moved by being pulled away from the eye and rubbed gently from side to side, after a drop of castor or almond oil has been dropped into the conjunctival sac. If this be done for several days—three or four days, or longer, according to the state of cicatrisation—each surface heals independently, and a symblepharon is prevented. This precaution should be taken hourly during the day and several times during the night.

When the transition fold is involved, in continuity with a greater or less extent of the ocular and palpebral conjunctiva, this treatment will not prevent an adhesion slowly forming, as in some part there is necessarily always a close contiguity between the opposing raw surfaces, which, in fact, meet at an angle which gradually closes up. In the less extensive burns of this nature much may often be done, if the patient is seen early after the accident, by covering in the raw surface left, on destruction of a portion of the ocular conjunctiva, with conjunctiva transplanted from the immediate neighbourhood. The wound must first be carefully cleaned, and as much of the burnt tissue removed as possible with scissors. The conjunctiva to either side is then undermined, and the edges drawn together by silk sutures. It is seldom that in this way all adhesion can be prevented, but it is often possible to limit the adhesion to the deeper part of the conjunctival sac, and thus to a great extent to obviate the serious consequences to the movement of the eye, which a more extensive symblepharon entails. The same treatment may be adopted in cases where a symblepharon has been allowed to form before the patient first comes under observation. Where the extent of injured conjunctiva is great, it is not possible to prevent an extensive symblepharon. Often the injury has at the same time caused great destruction of the cornea, so that the necessity for keeping the lid and eye apart may not be of any urgent practical importance. A very extensive symblepharon, too, when it has become established, is usually a very difficult condition to improve by any operation. In such cases it is rarely advisable to interfere, except when the eye affected is the only one in which any vision has been retained, and a good chance offers of increasing the usefulness of the eye by iridectomy, or otherwise, when the lid attachments have been more or less overcome. Such cases are, however, infrequent, and not ones the treatment of which any comparatively speaking inexperienced operator should undertake.

DISEASES OF THE CORNEA.—The various diseases of the cornea are in all respects the most important of the common diseases of the eye. They are for the most part cases in which not a little good can be done by proper and judicious treatment, and much harm may result from wrong interference or neglect. Their importance lies in this, coupled with the value to vision of the normal cornea. There are other parts of the eye which are of course equally valuable in this respect, but of few of them can it be said with equal justice that the treatment is often of great importance in influencing the consequences of the diseases by which they may be affected.

The main dangers to which the cornea is exposed by inflammation are, more or less serious permanent loss of transparency, and alterations in its curvature. Any collection of inflammatory products within the meshes of the corneal connective tissue causes an intransparency, and this, according to circumstances, may or may not be permanent. When there is no actual destruction of corneal tissue to account for some, at all events, of the inflammatory products, there need be, and generally there is, no permanent opacity left in the cornea. A localised inflammatory destruction, however, anywhere, is followed by cicatricial tissue formation, and this is always intransparent. In infants and young children, in whom the tissue changes are active, even cicatricial opacities may clear. This, however, takes place very slowly, as the connective tissue of the cicatrix gradually becomes replaced by corneal connective tissue.

The points in this connection which are of practical importance, then, with respect to both prognosis and treatment, are the recognition of interstitial infiltration opacities from cicatricial opacities, and the influence of the patient's age in the stability of the latter. Both forms of opacity may exist together. That is to say, we may find at some stage in the healing process an area of the cornea in which the opacity is due to cicatrisation, surrounded by one often considerably more extensive, in which the cause is merely an infiltration. It frequently happens, too, that, owing to the latter obscuring more or less of the pupillary portion of the cornea, vision is much more interfered with than it eventually is, after all possible absorption has taken place. The surrounding infiltration can generally be recognised by its less pronounced whiteness and density. Further, its margins merge indefinitely into the clear cornea, never ending sharply, as does a cicatricial opacity. The surface of the cornea, the epithelium, is often irregular over the cicatricial—never so, or at least only finely stippled, where the cause of the dulness is mere infiltration.

Although it is common to talk of opacities in the cornea from cicatrisation and infiltration, the loss of transparency does not in reality ever lead to real opacity. The tissues remain translucent, and it should be remembered that translucent nebulæ or leucomata in the cornea, as they are called, may interfere with vision, not by altogether excluding more or less of the light rays which should enter the pupil to form the retinal image, but by scattering those which they intercept. The scattered rays lead to a general blurring of the retinal images, by which the visual acuity is diminished. It is for this reason that tatooing of a nebulæ, with or without iridectomy, may lead to considerable improvement in vision.

NOTES ON DIARRHŒA AND ITS TREATMENT.

By A. C. Dutt, B.A., M.B. Cantab., *Hull.*

During the months of July and August last there was a severe epidemic of diarrhœa in Hull; and for several weeks the death-rate of the city was higher than that of any other large town in England. The brunt of the epidemic was felt most severely by infants and very young children; and as the writer had about seventy cases under his care without a single death, he ventures to hope that a few notes on the treatment would not be unacceptable.

Given a case of acute diarrhœa in an infant, the first thing to do is to give a teaspoonful of castor-oil, or 2 grs. of calomel; if dry putty-like masses are passed, all milk-food is stopped, and Nestlé's food (*not* the condensed milk) is given. The "humanised milk" supplied by the Aylesbury Dairy Company has not been found to answer in such cases. With the ingestion of Nestlé's food, the motions soon lose their putty-like consistency, and assume a dark brown colour. There is one drug which the writer has found most useful in such cases—chamomilla. A tincture is made from *Chamomilla matricaria*, gathered when in bloom.

Lauder Brunton gives the properties of this drug as "bitter, strongly aromatic, carminative and anthelmintic."[1] Ringer advises half a drachm or a drachm of the infusion "in the ordinary summer diarrhœa of children, characterised by green, many-coloured, and slimy stools."[2] The oleum anthemidis has been occasionally used in "biliousness" and diarrhœa. I consider the tincture of the German chamomile (*Matricaria*, U.S.P.) the best preparation. It numbs morbid sensitiveness of the "sensory and excito-motor nerves." In the diarrhœa of children and in many of the nervous affections during dentition, it acts as a specific. In the case of a baby 5 months old, I had rung the changes on zinc oxide, catechu, bismuth (carbonate, subnitrate and salicylate), tannic acid, chalk mixture, aromatic chalk powder, listerine, etc., but without producing any impression. Milk and lime water, white wine whey, peptonised milk, Allen and Hanbury's food—were all rejected by the stomach. A drop of chamomile tincture was given in water every hour. After six doses had been taken, convalescence was rapid, and no other treatment was required.

The tincture is best given in drop-doses every hour. If sickness is a prominent symptom, the following prescription answers well:—

℞ Bismuthi carb.	ʒss
Tr. camph. co.	♏xij
Tr. chamomillæ	♏xij
Glycerini	ʒij
Aqua cinnamomi	ad ℥iss

M. fiat Mist., ʒj, *tertia q.q. horâ p.p.a.* (child, 8 months).

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[1] "Pharmacology and Therapeutics," p. 874.

[2] "Therapeutics," p. 592.

Astringents like catechu, kino, tannic acid, etc., are unscientific, and had better be avoided. Logwood, however, is often useful, and may be combined (in the form of freshly-made decoction) with the above mixture. I have been disappointed with the aromatic chalk powder, chalk mixture, and sulphuric acid. In addition to Nestlé's food, five drops of Wyeth's beef-juice should be given every two hours, with a drop or two of brandy when required, and the abdomen and extremities should be kept warm. With the onset of convalescence, ordinary diet may be gradually resumed.

In green diarrhœa the writer has tried lactic acid, but no effect was observed in the cases in question. According to Pfeiffer, green stools are evidence of pathological alkalinity somewhere in the intestinal canal. In such cases, I have given one or two drops of nitro-muriatic acid before meals, and $\frac{1}{6}$ gr. of mercury-and-chalk powder after meals with good effect. If much undigested food is passed, I have added 1 to 3 grs. of lactated pepsin to the bismuth mixture.

The usual treatment of diarrhœa in adults has been—(1) 1 oz. of castor-oil; (2) 15 to 20 minims of chlorodyne three times a day, to be followed, when necessary, by bismuth and nux vomica.

CLINICAL RECORDS.

CASES IN OBSTETRIC PRACTICE.

By J. WHEELER O'BRYEN, M.D., *Sydenham, London.*

CASE 1.—*Retroversion of gravid uterus.*—Mrs. B., at the fourth month of utero-gestation, was, about two o'clock in the morning, suddenly seized with vomiting and violent abdominal pain. Three hours after the onset of these symptoms she tried to pass water, but was unable. A neighbour and friend of hers was sent for, who diagnosed "acute inflammation," and, instead of sending for a doctor, ordered hot linseed poultices with some mustard, to be kept on continuously. The vomiting lessened, but the pain increased in severity, and the desire to urinate became very distressing. I was sent for at 9 A.M. on the day following—twenty-seven hours after the onset of the symptoms. The patient was then in a state of collapse, and threw herself about as if in great agony. Vaginal examination disclosed the usual condition of things. The bladder being emptied of a large quantity of highly ammoniacal urine, chloroform was administered by a medical friend, and the organ replaced after considerable difficulty. A Hodge's pessary was introduced, and the patient kept at rest. She expressed herself as feeling comfortable for three days, when she was again seized with pain, and in a few hours aborted. Twelve months after this occurrence she was pregnant, and at about the fifteenth or sixteenth week of her pregnancy retroversion recurred. This time, however, I was summoned to her assistance at once, and had no difficulty in replacing the organ without the aid of an anæsthetic. She went to full time, and when labour had gone on twenty-two hours, with but very slight progress, after a consultation with Mr. Scott, of Penge, it was decided to dilate the cervix and deliver by forceps. Accordingly, the patient was chloroformed and delivery accomplished with difficulty. I saw the woman only once after delivery, as an attack of influenza laid me up within twenty-four hours, so that her subsequent treatment was in the hands of my *locum tenens.* Unfortunately the patient developed peritonitis, and died on the fifth day. She was a primipara, æt. 37.

CASE 2.—*Sudden death in labour.*—Labour set in with Mrs. M., an apparently healthy woman, æt. 28, at four o'clock on the morning of 20th June 1894. I was sent for at 10 A.M., but the cervix being dilated to only about the size of a shilling, I did not stay with her. The presentation was normal, and apparently labour was going on satisfactorily, so I instructed the nurse when to send for me, at the same time stating that I would probably not be required for some hours. At 11.15 I had started on my visits, intending to give this patient another call between 12 and 1. Almost immediately after my departure from home a message came requesting me to go to Mrs. M. at once, as the nurse thought she was either "dying or dead." I arrived at the patient's house an hour later, and learned that she died about the time the urgent summons was sent for my attendance. Two years previous to this the patient was attended by me in her first confinement, and had a natural labour in every respect. She never had any serious illness, her only trouble being, as the mother put it, "an occasional attack of hysteria and fainting." There was no post-mortem, and I came to the conclusion that death was due to syncope.

REMARKS.—Among the functional causes of sudden death during or after delivery, M'Clintock cites several instances of syncope, shock, and exhaustion. Playfair says that a large number of cases of sudden death are due to thrombosis or embolism of the heart and pulmonary arteries. I am satisfied my patient was free from organic heart disease, as I had carefully auscultated this organ when examining for the fœtal heart sounds at ten o'clock. Most of the instances of sudden death recorded appear to have occurred during the second stage of labour. My patient died early in the first stage.

REVIEWS OF
BRITISH AND FOREIGN LITERATURE.

Wounds in War: the Mechanism of their Production and their Treatment. By Surgeon-Colonel W. F. Stevenson, Professor of Military Surgery, Army Medical School, Netley. London: Longmans, Green & Co. 1897.

Changes in the manner of production of "wounds in war," due to the employment in warfare of new firearms and missiles, and changes in the methods of treating all injuries and wounds, due to the great progress which has been achieved in surgical science and art during the last quarter of a century, have for some time past created an urgent need for a systematic and authoritative English treatise on military surgery. The works of Ballingall, Guthrie, Longmore, Macleod, and MacCormac, excellent in their day, and even the magnificent "Surgical History of the War of the Rebellion," by G. A. Otis, represent the results of conditions and methods which no longer exist, and have been superseded by novel circumstances and appliances, which, in this branch of surgery even more than in general surgical practice, have altered the aims and scope of surgical relief most profoundly. Nélaton's celebrated probe, for example, no longer serves for the detection of modern bullets, whose steel or cupro-nickel envelopes refuse to impart to its porcelain tip the stain which formerly revealed the leaden ball. Nor can Bauden's screw extractor, which entered and removed the soft missile of the past, penetrate the hard shell of the modern projectile.

These are comparatively small indications of the great changes which military surgery has undergone of late years. Improvements in hospital construction and administration, in arrangements for succouring and transporting the wounded, in space and conservancy, in appliances and dressings, and, above all, Lister's brilliant application to surgical science and practice of Pasteur's researches regarding the causation of fermentation and putrefaction, and the grand advances in conservatism and remedial resource which aseptic and antiseptic methods have wrought,—these have revolutionised military as well as general surgery. Hospitalism, which was rampant and deadly in military hospitals of the olden time, has been all but expelled from the field and general hospitals of the present day; and while the army surgeon attempts daring procedures, undreamt-of of yore, he has the satisfaction of knowing that his efforts result in a great and increasing saving of limb, function, and life.

Professor Stevenson, who is well known as an able instructor in the Netley School, where young army surgeons receive systematic training in subjects essentially necessary for the successful practice of their special calling, has, by the present work, supplied a large void in English medical literature. He has done so admirably well. The arrangement is methodical, the balance of parts good, the information imparted quite up to date, the descriptions clear, the citation of authorities judicious, the discussions of symptoms, signs, and expedients shrewd and wise, the style simple and luminous, and the cases and illustrations good. It is noteworthy, however, that antiseptic surgery, as applied to military emergencies, offers more hope for the future than illustrations in the past. It is only towards the end of the Russo-Turkish war that any serious attempt was made to adopt it in any first-class campaign. How far the difficulties inseparable from practising scientific and exact surgery in war can be overcome, is a problem for future solution. Fortunately, simplicity has greatly supplanted complexity in the aseptic and antiseptic methods, whose details are quite within range of easy accomplishment, even on the battlefield.

The work details fully the construction of modern weapons and missiles, and the dynamics of the flight of the latter. The kinds of injuries produced by these, as indicated by experience and experiment, are clearly set forth. Shock and hæmorrhage are fully described. As regards the latter, seeing that such a large proportion of wounds and injuries are fatal by primary hæmorrhage, the methods of immediate stoppage of bleeding by indiarubber cords, needles, pressure forceps, etc., might perhaps have been more fully treated of. Wound treatment on aseptic principles is described, and the special treatment of bullet wounds detailed. Then follow chapters on gun-shot wounds of joints in general, and of special joints, of the long bones, head, chest, abdomen, and pelvis—all practical and instructive. Details of surgical operations, and other matters, which are found in surgical text-books, are very properly omitted. A chapter is added on "The Effects of the Use of Modern Small Arms in the Wars of the Future," and another on the articles of the "Geneva Convention," which are frankly and freely criticised. The surgery of the face, eye, and ear are omitted, probably because the special and minute details which it would be necessary to introduce, would be inconsistent with the plan and scope of the book.

The work, as a whole, is highly creditable, and reflects credit on English surgery and the useful institution in which the substance of it has been employed for lecturing purposes. So rapid in these days is scientific progress, that, since the issue of this book from the press, all the wonders and advantages of the Röntgen photography have been elaborated. How intimately and beneficially this marvellous discovery affects the subject-matter of the book, more especially as regards the important point of fixing the location of lodged bullets, is well known.

This subject is being diligently worked out at Netley, and the next edition of "Wounds in War" will, doubtless, fully deal with it.

KENNETH MACLEOD.

The Practice of Surgery: A Treatise on Surgery for the Use of Practitioners and Students. By Henry R. Wharton, M.D., and B. Farquhar Curtis, M.D. London: J. B. Lippincott Company. 1898.

This handsome volume of over 1200 pages is an ambitious attempt on the part of its authors, two well-known American surgeons and teachers of surgery, to rival the admirable "Text-Book of Surgery" by American authors, edited by W. W. Keen and J. W. White.

To attempt to write a work that would be capable of holding its own with such a text-book was a plucky venture, and we are glad to be able to congratulate the authors on having achieved a very considerable amount of success in their endeavour. They have produced a text-book which may safely be recommended as a reliable guide to the student commencing the study of surgery, for he will find in its pages much valuable information, conveyed in a terse, intelligible, and judicious way, and will learn nothing that he will subsequently have to unlearn.

The work is designated the "Practice of Surgery," and is rightly essentially practical in its scope. Now that every student studies a work on pathology, and most students, in addition, a separate work on surgical pathology, there is, in the more recent works on surgery, observable a tendency to curtail the amount of space devoted to the so-called principles of surgery, and to allot the space thus gained to the major part of the work dealing with the practice of surgery. This tendency is markedly noticeable in the work before us, and yet the chapters devoted to what is generally called the principles of surgery contain in clear and simple language all that a student who possesses a work on pathology could reasonably expect to find in his surgical text-book. Nevertheless, it seems at first sight somewhat strange not to have separate chapters allotted to such important subjects as Tuberculosis, Gangrene, Ulceration, and Suppuration.

Chap. viii., "Asepsis and Antisepsis," may be taken as an example of the general excellence of the work. It would be very difficult in the relatively small compass of eighteen pages to present to the student a clearer description of the aseptic and antiseptic methods—sterilisation of hands, instruments, dressings, etc., of the agents employed to ensure asepsis, of the comparative merits of all the commonly employed antiseptics, and of the preparation of all the materials used in aseptic operations, including sponges, gauze pledgets, silk, silkworm gut, catgut, drainage tubes, and the various dressings. This chapter is one of the best in the book, and may be studied even by the operating surgeon with advantage.

Chap. ix. gives in forty pages a short but reliable account of Minor Surgery, including bandaging, plaster of Paris dressings, artificial respiration, and various forms of suture.

Chap. xii., "On Anæsthetics," commences with a description of cocaine anæsthesia, in which the authors wisely insist that solutions of cocaine shall not exceed at the most 4 per cent. They express the opinion, with which we cordially agree, that analgesia can be as satisfactorily obtained with these as with the stronger solutions, whilst, of course, the risk of toxic symptoms is much diminished. They further rightly insist that not more than 1 gr. of cocaine shall be administered hypodermically.

The anæsthetic recommended for general anæsthesia is ether, administered by the *open* method. Few anæsthetists will agree with our authors that by the closed method, *i.e.* with a Clover inhaler, asphyxiation is likely to occur.

Amputations are well described, but badly illustrated, Fig. 241 showing the point of the knife directed so that it must of necessity injure the skin-flap which is being raised.

The Surgery of the Head is treated in chap. xxiv., in forty-four pages. This is another instance of the authors' skill in combining clearness of description with brevity. We have carefully read through this chapter, and can find no subject omitted that should be mentioned. The authors have borne in mind that their book is one for students and general practitioners, and have, therefore, wisely omitted many operative details which concern only the operating surgeon. Thus the removal of the Gasserian ganglion, an operation which no one but an operating surgeon would attempt, is dismissed in fourteen lines without any detailed description of the procedure.

An excellent section on "Injuries and Diseases of the Eye and its Appendages," by Professor De Schweinitz, is included in the work. This is as it should be. The fact that Ophthalmology is so extensive a subject that it is in the hands of specialists is no justification for its total omission from a Students' Manual of Surgery. Certainly all common injuries of the eye should be included in such a work.

In an American work on surgery we naturally turn with interest to the subject of appendicitis. We are glad to note that our authors hold that in appendicitis the temperature is an uncertain guide, but a rapid pulse is a reliable sign of suppuration. Most British physicians will, however, dissent from the statement that pus will be found at the end of forty-eight hours in the *majority* of cases of appendicitis. We concur entirely, however, with the advice, that after every operation for appendicitis, especially in cases with abscess in which the wound has been packed, the patient should wear an abdominal belt, fitted with a hard rubber plate secured directly over the scar, for at least a year.

The work is described as profusely illustrated, and this with reason, as the illustrations number 923. Of this number, 190 are admittedly borrowed from Agnew. This strikes one as rather a large proportion to take from a single source, especially as no mention of their indebtedness to this writer appears in the authors' preface. It must be acknowledged, however, that these illustrations taken from Agnew are among the best in the book. The less said of the majority of the original illustrations the better, as many of them are the very worst we ever remember to have seen.

Apart from the illustrations, the book leaves comparatively little to be desired. It will, undoubtedly, become popular with the American student, to whom it can safely be recommended as a sound and trustworthy guide to the practice of surgery.

HERBERT F. WATERHOUSE.

The Deformities of the Fingers and Toes. By WILLIAM ANDERSON, F.R.C.S. London: J. & A. Churchill. 1897.

THIS little work has been developed, as the author tells us in his preface, from the Hunterian Lectures, delivered by him before the Royal College of Surgeons of England in 1891. To the subjects treated of in this course of lectures has been added a section upon the *congenital* deformities of the hands and feet. The subject-matter of this book will be familiar to many surgeons, as the Hunterian Lectures were published in the medical journals. We may select Dupuytren's contraction as the subject of greatest interest to the surgeon in section 1, dealing with contraction of the fingers. Regarding this important condition, Mr. Anderson gives preference to the subcutaneous operation, an opinion which we think will be shared by the majority of surgeons. He forcibly insists upon the necessity of wearing a splint at night for several months, and of practising passive extension and active movements at every possible opportunity during the daytime. If such instructions were generally carried out, we should hear much less frequently about unsuccessful cases of operation for this affection.

Section 2, "Contraction of the Toes," contains a very learned account of the condition known as hammer-toe. The treatment recommended by the author is resection of the head of the proximal phalanx, by means of bone nippers, through a lateral incision. Amputation for this condition is strongly condemned. Concerning hallux flexus, it is pointed out that there is a natural tendency to recovery, and that destruction of the metatarso-phalangeal joint of the great toe (by resection) entails a permanent alteration in gait. For mild cases, Mr. Anderson recommends passive movements and massage; and for more severe cases, forcible extension of the joint and fixation in the super-extended position for three weeks. The work is one which should be read by every surgeon. The descriptions of the various conditions are lucid and distinctive, and the advice as to treatment always sound and judicious. Our only regret is that the subject of talipes is not included. We hope that Mr. Anderson may in a subsequent edition find space to devote a chapter to the various forms of club-foot. The illustrations are from the author's pencil, which is equivalent to saying that they are models of excellence, Mr. Anderson being Professor of Anatomy at the Royal Academy of Arts.

HERBERT F. WATERHOUSE.

Mastoid Abscesses and their Treatment. By A. BROCA, M.D., and F. LUBET-BARBON, M.D., Paris. Translated and Edited from the French by HENRY J. CURTIS, M.D. London: H. K. Lewis. 1897.

THE importance of the mastoid region of the skull, from a surgical aspect, is beyond all question, and a consideration of the various operative methods employed in dealing with suppurative disease, and the results so obtained, are worthy of our attention. The authors of this monograph give the practical conclusions which they have drawn from 143 operations performed upon 128 patients, and they have not hesitated to publish those cases terminating fatally along with their successful results, thus increasing in a marked way the value of their statistics. The whole subject of mastoid inflammation and abscess is very fully treated. Certain points to which we would draw the reader's attention are emphasised. Their experience supports the fact of the almost constant association of mastoid inflammation in cases of acute otitis media. They characterise the employment of Wilde's incision, or cutting down through the periosteum, as almost always useless, and very often dangerous, as giving a false security both to patient and doctor. Periostitis of the mastoid process *per se* is rare; and if no sign of a diseased area is found on the surface of the bone, it is better to perforate in the ordinary way, with the certainty of finding the origin of the mischief in the air cells. Three cases of suppuration limited to the "border cells" of the mastoid are described, characterised by the presence of granulation tissue on the posterior wall of the meatus, surrounding a fistulous orifice leading into a bony cavity. These cells lie superficially, and are separated from the external auditory meatus by only a thin layer of bone, and through this the pus may easily find its way out. In one of the cases a diagnosis of a boil in the meatus was in the first instance made. The authors base their remarks on a large experience, and on that account they deserve the attention of all who are interested in this subject. We are indebted to the translator for making this work so readily accessible to the English reader, but here and there the translation suffers considerably, doubtless from an attempt to follow the original too closely.

A. Logan Turner.

The Diseases of Women: A Handbook for Students and Practitioners. By J. Bland Sutton, F.R.C.S., and Arthur E. Giles, M.D. London: The Rebman Publishing Company. 1897.

The authors of this volume state in their preface that it has been their desire to write a book useful to students preparing for examination and in their practice afterwards, and it may at once be said that they have succeeded in producing a trustworthy elementary manual of gynæcology.

The first three chapters give an outline of the anatomy and physiology of the reproductive organs, and the various modes of gynæcological examination. Three chapters follow, dealing with the malformations of the genital organs. The diseases of the vulva, vagina, uterus, ovaries, tubes, and pelvic peritoneum are considered in the next twenty-six chapters. Then comes a chapter dealing with the disorders of menstruation, and another with dyspareunia and sterility. Diagnosis is considered in two succeeding chapters, and the remainder of the book—ten chapters—is devoted to gynæcological operations.

The pathological descriptions are worthy of special commendation. Though brief, they are clear and succinct, and convey definite and accurate impressions of the conditions met with. The limits of the book no doubt preclude anything like elaborate accounts of the clinical features of the various diseases, but in many instances they are unduly perfunctory and bare. The chapters on the diseases of the vagina, of the tubes, and on uterine myomata, may be cited as being satisfactory, while those dealing with the peritoneum, with pessaries, and the disorders of menstruation, are peculiarly meagre.

The section devoted to operative measures is on the whole well written. Details are in great measure omitted, but the main steps of the operation are clearly described in concise language. The brevity of some of the descriptions makes them a little misleading—the operation of curetting is very summarily dismissed, and the impression one gathers from the description of hysterectomy is that it is a much simpler operation than repair of a perineum!

The illustrations are specially worthy of notice. All of them are good, many are original, and models of what such illustrations should be. On the whole, the volume may be commended to the student as a sound guide to the subject. R. Milne Murray.

Klinische und experimentelle Beiträge zur Pathogenese der mercuriellen Stomatitis und Salivation. Von Dr. Alfred Lanz. Berlin: Oscar Coblentz. 1897.

Though now, thanks to the care exercised and the methods employed in the administration of mercury in Britain, cases of mercurial stomatitis are rare, indeed are scarcely seen, unless in those persons who are constitutionally susceptible to the mineral, yet the causes which produce it, and, as a corollary from these, the best means of avoiding it, are very legitimate objects of inquiry. This subject, though a small one, has been investigated by Dr. Lanz with all that minute care so characteristic of the researches of many of our continental confrères. Nothing seems to have been omitted to arrive at correct conclusions. First, the views of the older and then of the younger syphilologists are examined in detail, and their deductions summed up. The points at issue having thus been ascertained, each is taken up *seriatim* by the author, compared with actual cases, and their validity or otherwise determined. Lastly, the conditions obtaining in man are contrasted with those artificially induced in cats and dogs. While a perusal of the work is necessary for the thorough comprehension of the topics therein discussed, still some of the conclusions arrived at may here be briefly stated. The stomatitis appears always to develop on that side of the oral cavity on which the teeth, from any cause, are least used in chewing. The effect of this disuse is partly indirect, since it leads to the deposition of tartar and consequent gingivitis. Carious teeth seem only to influence it so far as they are apt to be avoided in mastication. Mercurial ulcers occur on those portions of the mucous membrane exposed to pressure from the teeth. These are also seen during the eruption of the inferior wisdom teeth on the gums in their neighbourhood, or after their complete emergence on the loose flap which often overhangs their posterior grinding surface. Stomatitis is most frequent on the lower jaw and near the incisor and eye teeth. Salivation observed in such cases is a reflex phenomenon, does not precede the stomatitis, and in about one-third of the cases never manifests itself at all. Neither the saliva itself nor the excreted mercury which it contains exert any marked effect on the production of the stomatitis. Clinical observation indicates the significance of bacteria in originating mercurial stomatitis, and in influencing the course of mercurial ulcers; but the nature of these bacteria is for the present somewhat obscure. To obviate these prejudicial effects of mercury, it is suggested that, before commencing a course, the state of the mouth should be investigated, and advice given to correct existing pathological deviations (carious teeth, deposit of tartar), and to neutralise the harmful influence of bacteria (careful cleansing and disinfection of the mouth). We have failed to find anywhere, however, a protest against the employment of mercury by subcutaneous injection—a method whose very activity constitutes a serious danger, while the dose once deposited in the tissues is wholly beyond our control; and as the rapidity of absorption varies in different individuals, possibly in the same at different times, it is impossible to estimate the degree of the influence exerted. Yet this is the mode had recourse to in most of the cases of mercurial stomatitis cited—a mode which we are glad to think has never found favour in this country, and, we trust, never will.

W. Allan Jamieson.

Diagnostik der Krankheiten des Nervensystems. Eine Anleitung zur Untersuchung. Nervenkranker. Von Professor Dr. A. Goldscheider. Second enlarged edition. Berlin: H. Kornfeld. 1897.

First published in 1893, the demand for the book has been sufficient to necessitate a second edition in 1897. The new edition has been largely rewritten, and much fresh matter added, to its advantage. In this country, books of exactly the same character are seldom if ever published; in Germany their name is legion. Goldscheider's "Diagnostik" corresponds only in part to our hand-books on medical diagnosis, whether on special or general lines, in that the description of the clinical methods for the elucidation of nervous diseases are supplemented by terse but comprehensive explanations of the maladies presenting the different symptoms. It is practically an aid to case-taking in nervous diseases, greatly expanded, and with the significance of each symptom clearly explained in connection with all the conditions under which it is found.

Such a method applied to a work treating of medical diagnosis in all its branches would necessarily yield too large a volume to serve any useful purpose; restricted to one system, it affords an admirable aid to anyone seeking for light in a difficult case, and who might flounder about in a large text-book for long before grasping the exact weight to attach to a given *symptom-complex*.

The volume in question commences with a scheme to be used in the clinical examination and case-taking of patients presenting symptoms of disease of the nervous system. As the scheme is very comprehensive, perhaps it is well that the author does not insist on its invariable use, for a complete carrying out of its items would occupy some hours. The scheme is to be used whenever the absence of clearly diagnostic signs renders a case of doubtful origin. The remainder of the first chapter is devoted to a detailed description of the points to be investigated in the family personal history, and the technique of the methods of use in the clinical examination of the case, arranged according to the preceding scheme.

Great stress is laid on the advantage gained from an exhaustive and thorough examination of all the parts of the nervous system in cases where any difficulty in diagnosis exists. It would serve no good purpose to enter into detail upon this part. One instruction might be noted as possessing some importance in the examination of patients with nervous disorders—the peripheral nerves should always be palpated and pressed upon, the skull percussed and auscultated. The first of these manœuvres, if made a routine practice, will possibly demonstrate the much more frequent occurrence of neuritis, more or less marked in cases presenting more obvious symptoms applicable to other lesions, than noticed at present.

The different methods which are employed in the detection of alterations in nerve function are explained at length, with a wealth of detail and explanatory tables and figures. Directions for testing the acuity of the senses follow.

Chapter II. is devoted to symptomatology, as presented by the motor and sensory nerves, the reflexes, and the sympathetic system in succession, with a note on spinal puncture. Each symptom in turn is shortly described, the lesion producing it demonstrated, and the disease causing the lesion mentioned. It is, perhaps, to be regretted that more space has not been given to the section devoted to the reflexes and reflex action, especially in connection with the "Neuronic Theory," a note of which has been added at the beginning of Chapter V. Full descriptions of the electrical phenomena, and of the disorders of speech and writing, occupy the next chapters, while in Chapter V. the author deals with topical diagnosis. A longer notice of the various atrophic processes arising from spinal lesions would not be amiss, but otherwise the different system-lesions are clearly illustrated.

The volume closes with a section on differential diagnosis, which adds much to the practical value of the parts preceding it. Altogether Goldscheider's work is certain to prove, in its new form, as useful and successful as when it first appeared.

A. Lockhart Gillespie.

Sir James Young Simpson and Chloroform. By H. Laing Gordon. London: T. Fisher Unwin. 1897.

Sir James Y. Simpson was one of the most conspicuous figures in the medical profession of the Victorian era. So many memoirs and notices of his life have been published, that it may seem superfluous that another should be issued. But as this year is the jubilee of the introduction of chloroform as a substitute for ether, the author seeks to revive the interest in its introducer, promoter, and defender. The writer of this notice was well acquainted with Sir James since 1850, and can recommend the book as a graphic and life-like presentation of the man as he was. It is not fitted for a review, being a continuous well-written narrative, suited for general as well as professional readers.

Simpson's life history may be studied from many points of view; but for the younger generation of doctors, the chief lesson is how indomitable perseverance and working up to an ideal can secure for a man of humble origin the most distinguished position in our profession. True, he had that inestimable boon, granted to few, the gift of genius, which enabled him to brush aside difficulties and to encounter risks which would be a bar to the progress of most. Still, the chief secret of his success was, early in life, to fix on an object he desired, and work up to that with unflinching energy. Few medical students, when attending for the first time a class in which they are interested, would have the presumption to say to themselves and others, "I shall wear that professor's gown."—Simpson said that and did it.

The book is well worthy of perusal by every young practitioner.

G. Buchanan.

La Technique des Rayons-X: Manuel opératoire de la Radiographie et de la Fluoroscopie. Par Alexandre Hébert. Paris: Georges Carré et C. Naud. 1897.

The author has paid special attention to the practical aspect of the subject, believing there is a place at present for such a work. While it would be unfair, in view of the references, to say that the different schools have not been referred to, the author nevertheless, from beginning to end, has been influenced by French scientific methods. Perhaps this is due to the fact that the subject, being comparatively new, it is difficult for any writer to do full justice to the work of other countries.

In the first part of the work there is a description of the sources of electricity, including batteries, secondary cells, mains, coils, and Crookes' tubes, along with many photographic details. The second part is devoted to the operative procedure necessary to obtain X-rays, and here the author treats not only of photography, but also of fluorescent screens. In the third part he describes the application of these processes to medicine and surgery, while the fourth and last is taken up with theoretical matters.

The same standard of careful work is carried out in the different parts, and it may at once be said that, for the class of workers for whom it is written, the book is to be recommended. The descriptions of apparatus being good, and the rules for the application of the rays clearly laid down, any one unaccustomed to the practice of the X-rays will find this a useful guide. The illustrations are well done, although we would point out that the reproductions are from photographs of the less advanced type. We do not have examples of the more difficult problems, such as the deeper-seated tissues of the body, and in this respect the work is not so well developed as some in this country and America.

J. Macintyre.

RECENT ADVANCES IN MEDICAL SCIENCE.

MEDICINE.

UNDER THE CHARGE OF

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HEREDITY.

Transmission of syphilis to the third generation.—Dr. George Ogilvie deals with this question (*Brit. Journ. Dermat.*, London, vol. ix. Nos. 108 and 109). By the "third" generation he means the grandchildren of those originally attacked, using it as more logically correct than the usual "second" generation. His paper is divided into three parts—(1) The transmission of actual syphilitic disease; (2) the transmission of what Fournier has termed "parasyphilis," or ultra-tertiary symptoms, shown by malformations or atrophy of certain parts of the body; and (3) the transmission of syphilitic immunity.

In the first part, the value of evidence as to the presence of actual syphilis in the grandparents, as to the possibility of acquired syphilis in the parents, and as to the possibility of accurate diagnosis of hereditary signs in the second and third generations, is judicially weighed. Proof of the presence of syphilis in the grandparents is judged to be of corroborative, not of intrinsic value. The possible acquirement by the parents of fresh infection cannot be absolutely excluded in almost any case, while the diagnosis of hereditary syphilis, apart from parasyphilitic conditions, can definitely be made from direct signs and symptoms.

The enormous difficulty atending all investigations into specific instances is illustrated by a number of cases, not one of which but presents some flaw or other in the chain of evidence between the first and third link. Dr. Ogilvie wisely remembers that *medio tutissimus ibis.* The statements of those who deny the possibility, and of those who positively assert the actual occurrence of transmission to the third generation, are equally unwarranted. There is, however, a reasonable probability that it does occur, but no evidence to support the possibility of transmission to the fourth generation.

In part 2 the suggestions so strongly brought forward by Fournier and Barasch and others, as to the occurrence of "parasyphilitic" distortions, atrophies, and dystrophies, are subjected to a douche of cold water, and are stated to be theoretical and anecdotal rather than actual records of facts.

In part 3 it is shown that clinical evidence has demonstrated the existence of a transitory immunity against syphilis in healthy children, born of syphilitic mothers during the secondary stage. From this comparatively jejune conclusion a universal law of protective immunity for the children has been evolved, lasting throughout life, whatever syphilitic stage the *parents* suffered from at the time of conception or birth. Dr. Ogilvie fittingly ends his criticism of the authors of this expanded theorem by quoting Duhring's latest addendum, to wit, that this immunity can be increased through the child being suckled by its mother, or by a syphilitic wet-nurse.

Is inherited syphilis contagious?—Mapes (*Med. Age*, 1897, p. 685) discusses the opinions of Fisher, Evans, and Parker on this subject, and comes to the conclusion that if a child can inherit *active* syphilis it may be able to transmit the disease to others, but, as the child presents none of the clinical manifestations of the disease in its infectious, contagious, or inoculable stages, as seen in original cases, the assertion that inherited syphilis can be transmitted is as yet not proven.

Infantile syphilis.—Hyde (*Med. News*, Phila., Dec. 4, 1897) deals with the same question from another standpoint—the conditions which influence its course. Hyde is almost tempted to go as far as Parker (*Edin. Med. Journ.*, June 1896) in regarding "inherited syphilis" as distinguishable from diseases "inherited from syphilis." Out of 1700 syphilitic pregnancies recorded by several observers, the fœtus was stillborn or abortion occurred in 579, about a third of the total. Of the 1121 children born alive, only 165 survived over twelve months. Of the total number, therefore, 1535, or nearly 95 per cent., perished. Hyde lays stress upon the possibility of diminishing the ravages of infantile syphilis by improving the nutrition of the infants.

TRANSFORMATION OF HEREDITY.

Kiernan of Chicago (*Medicine*, Chicago, September 1897) contributes a well-thought-out and valuable paper on the general principles underlying the transformations of heredity. He draws attention to the fact so often overlooked, that insanity is not the only factor which can with benefit be investigated in tracing hereditary influences back through history. Moreau has indicated very fully the different lines along which such inquiries should proceed. Charrin and Gley produced degenerative changes in rabbits, the offspring of parents inoculated with the bacillus of blue pus or its toxins. The results were not uniform, but demonstrated that the analogous degenerations in man from the syphilitic virus are capable of stimulation from other toxins. Kiernan then gives the history of a family investigated by himself. The original progenitors, a farmer, who was gouty, and his wife, had five children. The eldest son made money, and married a society belle, the last scion of an old family; the second, a daughter, with club-feet and early gout, married a society man with cleft palate; the next daughter, with strabismus, married a man of old family with migraine; the next, who was healthy, married a man who developed ataxia soon after; while the youngest son became ataxic at 18. The family of the eldest son comprised "an imbecile son, a hysteriac, a female epileptic with a double uterus, a nymphomaniac, and a society man who wrote verses." The second couple were blessed with a migrainous strabismic son, and dead triplets; the third with a sexual invert daughter, a choreic, a normal, a cyclopic, and a cloacal daughter, and a deaf-mute phthisical, an ameliac, and a normal son; the fourth couple had six sons—(1) dead-born sarcomatous; (2) with early gouty tophi; (3) and (4) twins, paralysed in infancy; (5) normal; and (6) ataxic at 14; and also two normal twin-daughters. The nymphomaniac of the first family married her migrainous cousin of the second. Four sons (a ne'er-do-well, a lunatic, an epileptic idiot, and a paranoiac) and three daughters (a dipsomaniac, a prostitute, and a healthy daughter), as well as deformed dead triplets, a double monster, and a hermaphrodite, formed their family. The further details of the family history consist almost entirely of deformed or insane descendants, with several monsters. Two instances of twins, four of triplets, and two of quadruplets, are included in this family history. Kiernan looks upon it as directly due to the influence on the progeny of the modified cell (of the original progenitor), "whose attributes are thus transmitted to the next generation." These attributes appear in this case to have deteriorated consecutively, while the facts vividly recall the family history used by Zola in his naturalistic Rougon-Macquart series, to illustrate in no squeamish manner the transformation of hereditary degeneracy.

THE RÖNTGEN RAYS IN THORACIC DISEASES.

F. H. **WILLIAMS** contributes (*Am. Journ. Med. Sc.*, Phila., December 1897) a beautifully illustrated paper of great interest on this subject, based upon the examination of 400 medical cases. No ill effects followed in any one of the number, and need not occur if the part exposed is not placed too near the Crookes' tube. Details of an interesting experiment follow. Equal quantities of various substances, measured by bulk and corresponding to 14·0 grms. of water, were radiographed, and the various existence values shown by the depth of tint produced. The substances selected were chosen with the view of ascertaining the values of the different tissues of the body. In the series figured, carbonate of magnesium, oils, gelatin, and albumin show little indication of their presence on the plates; glycerin and water come next; while common salt and sulphur, among other substances, give the darkest result.

The chest is much more permeable to the X-rays than the abdomen, the vault of the diaphragm appearing as a dark and moving convex mass, compared with the relatively almost white areas corresponding to the lungs. "In the stout or the aged the lungs appear less bright than in the thin or the young. The right apex seems to be normally darker than the left. At the stage of full inspiration the pulmonary area is lighter than at other times. The average range of movement of the diaphragm in health is 2¾ in. on the right and 2½ in. on the left, the maximum noted reaching 4 in. In tubercular cases the average was only 1¼ in., being often less than ½ in. In many cases the use of the fluoroscope demonstrated the presence of pulmonary tuberculosis, and the accompanying diminished range of movement on the part of the diaphragm before physical examination revealed it. Much more of interest is contained in the paper, especially in relation to the exact position of the heart, and most of the text-books upon physical diagnosis will have to be revised if the observations are correct. The author claims the following advantages for the habitual use of the X-rays:—

"The fluoroscope gives us earlier evidence of disease in some cases of tuberculosis, and more accurate information of its extent (this affects the prognosis) than can be obtained by the usual physical examination. The fluoroscope gives us more accurate information of the extent of the disease (this affects the prognosis) in pneumonia, and of the duration of an abnormal condition of the lungs. It shows a displacement of the heart in pleurisy, which is sometimes not recognised by other means, and assists us to recognise and estimate the amount of fluid in the pleural and pericardial sacs. It enables us to recognise or exclude emphysema. It enables us to ascertain the cause in some cases of dyspnœa that would otherwise be obscure. It assists us to recognise œdema of the lungs, pneumothorax, hydrothorax, and pneumo-hydrothorax. It gives us the means of making an earlier and more certain diagnosis of some cases of thoracic aneurism than any other method, and enables us in certain cases to exclude it where it has been suspected but is not present. It enables us to outline the heart more accurately and completely than has hitherto been possible, and to observe certain changes in it; and it especially assists us to a more accurate determination of the size, movement, and position in disease, and in some cases to observe, not only the heart as a whole, but the auricle and ventricle separately. Further, it enables us to recognise earlier associated conditions, such as œdema of the lungs, and assists us to recognise pericardial effusion."

SURGERY.

UNDER THE CHARGE OF

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INFECTIVE DISEASES OF THE URINARY PASSAGES—CYSTITIS.

Rovsing of Copenhagen (*Ann. d. mal. d. org. génito-urin.*, Paris, October, November, and December 1897), after referring to the difficulty in classifying the different forms of cystitis, indicates his preference for the following:—

1. *Catarrhal or non-suppurative cystitis*, caused by organisms which are devoid of pyogenic properties, and do not attack the mucous membrane of the bladder directly, but which decompose the urine, and, by rendering it ammoniacal, cause irritation and inflammation of the membrane with which it is in contact.

2. *Suppurative cystitis*, of which there are two main groups—(1) *An ammoniacal form*, in which pyogenic organisms are concerned,

capable of decomposing the urine; *and* (2) *an acid form*, for the most part due to the tubercle bacillus, but also caused by other microbes, *e.g.* the gonococcus, the colon bacillus, the *Streptococcus pyogenes*, etc.

Considering in greater detail the cases of *catarrhal or non-suppurative ammoniacal cystitis*, it is found that the microbes concerned (non-pyogenic) are derived from the urethra by the passage of instruments, by forcible injections, or by any obstacle to the outflow of urine. The condition is not to be regarded as an initial stage of the suppurative form, for it has been observed to persist as a catarrhal cystitis for weeks or months. The symptoms are almost entirely local—frequent and painful tenesmus, tenderness above the pubes. The urine is usually alkaline, turbid, and deposits a sediment which may be glairy and resemble pus. Microscopically, it consists of triple phosphates, urate of ammonia, vesical epithelium, and bacteria. Occasionally there may be a few leucocytes and red blood corpuscles. The urine clears on the addition of nitric acid. The mucous membrane of the bladder presents a diffuse redness when observed with the cystoscope. The prognosis is good. The symptoms rapidly disappear under the administration of boracic acid, or other agent, which will neutralise the alkaline reaction of the urine. Where the bacteria resist, and are very numerous, they may be dispelled by a single injection with a solution of silver nitrate, 1 to 2 per cent.

Suppurative cystitis—(1), or *ammoniacal group*, includes cases in which the colon bacillus coexists with other microbes which decompose the urine, and cases in which the latter are alone present. Rovsing's conclusions are based upon sixty cases. He maintains that the organisms (cocci of various kinds, proteus, Hauser, etc.) which decompose the urine are the essential and exciting causes of the cystitis, and that the colon bacillus, when present, is only able to invade the mucous membrane of the bladder when it has been damaged by contact with an irritating fluid, such as ammoniacal urine. When the colon bacillus is present, one is very apt to ascribe to it the chief rôle in the production of the cystitis, for in the examination of the bacteria from the urine, by any of the cultivation methods, the other and much more important organisms escape identification. The pyogenic organisms reach the bladder from the urethra in the majority of cases; in a minority they are derived from the kidney or from the renal pelvis: those found by the author, both by the microscopical examination of stained films and by cultivation, are as follows:—

Staphylococcus albus	in	13	cases
„ *aureus*	„	12	„
„ (microscope only)	„	7	„
Diplococcus ureæ	„	3	„
„ (microscope only)	„	1	„
Staphylococcus ureæ	„	4	„
„ (microscope only)	„	2	„
Sarcina alba	„	1	„
„ *flava*	„	2	„
Coccobacillus ureæ	„	1	„
Proteus hauser	„	5	„
Bacillus longus ureæ	„	8	„
„ *crassus*	„	1	„

The symptoms and progress of the cystitis are much influenced by the particular organism which is present, by its virulence, and by its capacities for multiplying. Staphylococci and streptococci are the causal agents in most of the severe cases. Complications, such as retention, stricture, tumour, stone, naturally influence the duration and result of the disease; at the same time it must be pointed out that they never give rise to cystitis—infection with micro-organisms is indispensable. In any given case of ammoniacal cystitis, it must be borne in mind that the urine when recently voided may be neutral or slightly acid in reaction; this is because the bladder may be emptied so frequently that the urine contained within it may not have time to undergo decomposition. It, however, soon becomes ammoniacal on standing. In making the diagnosis the cystoscope is unnecessary, but it may be useful in affording information as to the existence of complications, *e.g.*, pyelitis, stone, tumour, foreign body. One of these may be suspected if rapid improvement does not follow local treatment by nitrate of silver.

Prophylaxis.—Inasmuch as this ammoniacal cystitis is usually the result of the introduction of instruments by the urethra, Rovsing adopts special precautions to prevent its occurrence. He assumes that it is impossible to get rid of the bacteria which are normally present in the urethra, hence a certain number are conveyed to the bladder every time an instrument is passed. If the bladder is healthy, and is not injured in the procedure, they do no harm and are voided with the urine. If there be, however, retention, stone, or tumour, cystitis readily supervenes. In all such cases, Rovsing injects the bladder through a catheter with a 2 per cent. solution of silver nitrate, especially when the instrument or instruments are passed on only one occasion. Where instruments are to be passed daily, or oftener, this cannot be carried out; but in such cases, should the urine become turbid or ammoniacal, the nitrate of silver should be had recourse to.

As regards *the treatment* of the condition itself, if it be uncomplicated, complete and rapid recovery may be brought about by injecting the bladder with silver nitrate, 1 to 2 per cent. In recent cases, one injection may suffice; in cases of long standing, the irrigation may require to be repeated during a period of one to two weeks, or longer. A sufficient amount of the solution must be introduced to distend the bladder (usually about 80 c.c.); after four or five minutes it is allowed to escape; the bladder is then rinsed out three times with sterilised water before the catheter is withdrawn, otherwise the silver nitrate comes into contact with the urethra. If the procedure is followed by painful contractions of the bladder (which is unusual), a morphine suppository should be inserted into the bowel. Rovsing states that, after trying a large number of other agents, he has found nitrate of silver by far the best. In very severe cases of cystitis, considerable relief may be obtained by retaining a catheter *in situ* for four or five days, and drinking large quantities of fluid; before withdrawing this catheter a final injection with silver nitrate, 1 per cent., is indicated. The local treatment is accompanied by the exhibition of the usual internal remedies; boracic acid is the most valuable. Benzoic acid, ura ursæ, and salol may also be employed. In cases complicated by lesions of the kidney or bladder (stone, tumour, etc.), these must be made the object of special treatment.

(2) *The acid form of suppurative cystitis* is much less common than the alkaline; Rovsing has collected only sixteen of the former, and as many as sixty of the latter. They are rarely the sequel of the passage of instruments. The microbes concerned are the tubercle bacillus, typhoid bacillus, the gonococcus, the *Bacterium coli*, the *Streptococcus pyogenes*. They gain access to the bladder from the posterior urethra, or by the ureter from the kidney. The symptoms vary with the character of the infection. In all of them, however, there is frequent and painful micturition, pain after micturition in the region of the bladder; the urine is acid and contains pus, and it remains acid on standing. The diagnosis has to be made from prostatitis, from posterior urethritis, and from pyelitis, and is much assisted by the use of the cystoscope, and by watching the results of treatment. A bacteriological examination is necessary to determine which of the different microbes is concerned; for this purpose the microscopical examination of stained films may prove sufficient. In uncomplicated cases, the irrigation treatment with nitrate of silver is usually most successful. Boracic acid and benzoic acid are of no value in acid cystitis. Salol, on the other hand, is to be given in full doses. Diuresis should be increased by drinking quantities of fluid. In advanced cases of tubercular cystitis, with ulceration of the mucous membrane, it may be necessary to have recourse to operative measures, whether directed to the bladder itself or to the kidney.

REDUCTION OF CONGENITAL DISLOCATIONS AT THE HIP BY MANIPULATION.

ADOLPH LORENZ of Vienna records his latest experience on this subject in a paper contributed to the *Trans. Am. Orthopædic Assoc.*, 1897. Only young children (at the most up to the end of the sixth or seventh year) can be subjected to this bloodless treatment with prospect of success.

His method is as follows:—The head must first be pulled down to the level of the acetabulum by extension; anæsthesia is necessary to overcome the resistance of muscles, and the traction must be applied slowly. The extended leg places itself spontaneously in the position of abduction, which is an advantage, for in this way the greatly shortened adductors are exposed to a more powerful extension. The femur is then flexed to a right angle, and at the same time rotated slightly inwards, in order to bring the head of the bone into the proper position for entering the socket of the acetabulum. To make it enter the socket, the extremity is gradually, and with great care (to avoid a fracture), more and more strongly abducted, till an almost right-angled abduction is obtained. During these efforts the head of the femur is grasped with the fingers, and one tries to direct it against the posterior rim of the acetabulum, in order to force it to finally jump over this rim by increased abduction. There is usually a fairly loud noise on reduction, and in the same moment the limb becomes visibly longer. If the abduction is diminished, reluxation is likely to occur, until such time has elapsed as is required for changes to occur in the acetabulum, which will render the reduction stable or permanent. A plaster of Paris case is applied from the nipples to the knee, with the limb somewhat hyperextended, rotated outwards slightly, and abducted to the necessary degree. As a rule, it is necessary to keep the limb fixed in this position for twelve weeks or longer. When the plaster case is removed, it will be found that the reduction has become more stable; the abduction may be considerably diminished without risk of reluxation; and the child may be allowed to go about with a high sole on the sound limb, to compensate for the apparent lengthening of the abducted limb. The child should be on its feet as much as possible, for the body weight is of service in bringing about changes in the joint which render the reduction more stable. The patient with every step forces the head of the femur more deeply into its new resting-place. In time, the child is allowed perfect liberty, with, however, a high sole (2 to 3 cms.) under the sound limb, and suitable exercises to develop the functions of the muscles.

THE TREATMENT OF LONG-STANDING EMPYEMA BY RESECTION OF THE CHEST WALL.

VOSWINKEL (*Deutsche Ztschr. f. Chir.*, Leipzig, Bd. xlv. S. 77) records the results of this operation, performed at the Urban Hospital, by Körte of Berlin. Three of the six cases had been already treated by resection of one rib and drainage (this of itself has resulted in cure of the empyema at Körte's hands in seventy out of 114 cases). For the more radical operations, the soft parts are either reflected in the form of a flap with its base above, or are separated by a vertical or horizontal incision. Portions of several ribs are then removed along with the thickened and sometimes calcified parietal pleura. Three of the six patients were discharged cured, after being under treatment for periods of four and a half months, seven months, and twenty-six months respectively. One patient was discharged with a fistula after six weeks. The remaining two were tubercular cases, and died a few weeks after the operation.

Voswinkel has also collected 129 cases from other sources, in which a similar radical operation was performed. The majority of these were of middle age. Males outnumbered females, in the proportion of eighty-two to eighteen. The empyema was right-sided in twenty-seven and left-sided in forty-four. The results are to be regarded as satisfactory: 56·3 per cent. were healed, 20 per cent. improved, 3 per cent. unchanged, 20 per cent. died. Only four deaths occurred immediately during or after the operation. Out of fourteen tubercular cases, eight died, and only two were definitely healed. Contrary to what might be anticipated, there would appear to be little or no tendency to spinal curvature, or to impairment of function of the corresponding upper extremity, following these operations.—*Centralbl. f. Chir.*, Leipzig, Dec. 12, 1897.

LOCAL ANÆSTHESIA.

DR. F. HONIGMANN of Breslau describes the excellent results which have been obtained with Schleich's method of local anæsthesia at the Allerheiligen Hospital. Since 1893 it has been employed in several hundred cases, chiefly in the out-patient department. In operations upon the fingers and toes, in which the use of Schleich's method presents certain difficulties, Honigmann very strongly recommends the method first introduced by Oberst. The finger or toe is rendered bloodless, and the arteries constricted at their base by a slender elastic band. Immediately below the constricting ligature, a small quantity of a 1 per cent. solution of cocaine is injected under the skin, towards the distal end of the digit and on each of its four aspects. Complete anæsthesia results in from three to ten minutes, and persists so long as the finger remains bloodless. The solution of cocaine must be quite fresh, and made with sterilised distilled water. Within the last six months Honigmann has employed this method successfully in eighty-six whitlows, eighteen amputations of the finger, twelve cases of ingrowing toe-nail, etc. Symptoms of cocaine poisoning were never observed, and the anæsthesia was absolutely perfect. —*Centralbl. f. Chir.*, Leipzig, Dec. 25, 1897.

OBSTETRICS AND GYNÆCOLOGY.

UNDER THE CHARGE OF

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Parturition during Paraplegia.

In an exhaustive treatise on this interesting subject, Routh relates with great fulness a case under his care. The patient, a multipara, when about seven months pregnant, met with an accident which produced immediate and complete paraplegia. For the week following there was a complete absence of the usual passive uterine contractions, which, however, subsequently gradually returned. Labour commenced after two months, on the two hundred and sixty-first day of gestation. The first stage lasted ten hours and the second stage two and a quarter hours; the placenta was expressed. During the "pains" a mere feeling of "tightness" was experienced, which was painless, but gave an inclination to hold her breath. On the head passing over the perineum the patient cried out, although no painful sensation was felt. Uterine contractions, as evidenced by palpation, were not so well defined as normal, being more or less constant, with intermittent aggravations. Post-partum contraction was feeble for several hours, though no undue hæmorrhage was present. Involution of the uterus and lactation were normal. The patient died six months later, and a complete post-mortem examination of the pelvic organs and spinal cord was made.

After reviewing the physiology of parturition and recorded cases of similar conditions, along with the secondary questions of conception and lactation during paraplegia, the author considers that the following views may legitimately be accepted:—(1) That in pregnant women with paraplegia, labour may be apparently normal, both as regards the period of its onset and its mode of completion, but without the sensation of pain; (2) involution and lactation are normal; (3) conception may take place during paraplegia.

As regards the physiology of parturition, a complete definition cannot yet be given; but, from experiments and observation of similar cases, the following assertions may be made:—

1. Parturition is both automatic and reflex, these being identified with the first and second stages of labour respectively.

2. Cerebral influence is unnecessary for co-ordinate uterine action, though it seems to regulate the regularity and intermissions of the "pains."

3. Direct communication between the uterus and the lumbar enlargement of the cord, through the medium of the sympathetic ganglia, is probably essential to regular and co-ordinate contraction and retraction of the uterus.

4. The uterus is probably able of itself to expel its contents as far as the passive part of the genital tract, even when deprived of spinal influence, spinal reflexes being then necessarily absent. In the absence of reflex action, however, the entire process of parturition would be irregular and probably incompletely performed.

5. Lactation is probably due as much to chemical changes in the blood as to nervous influence; this chemical change being probably the result of the metabolism of the pregnant uterus and not from ovarian stimulus.—*Trans. Obst. Soc. London*, 1897.

DIGITAL EXAMINATION OF THE UTERINE CAVITY FOR DIAGNOSTIC PURPOSES.

BANGA (*Chicago Gynæc. Soc.*, Sept. 1897), in an eminently practical manner, describes the many advantages to be gained by a thorough digital examination of the uterine cavity, as a diagnostic. For this purpose he confidently recommends the laminaria tent, thoroughly sterilised by heat, and kept in a solution of iodoform in ether or alcohol, as being absolutely safe, efficient, and simple. It should always be used when any doubt exists as to the presence of any foreign body in the uterus, such as a dead ovum in whole or in part. In all uterine troubles, where hæmorrhage is the chief symptom, a second curetting should never be undertaken before a digital uterine examination has been performed.

Particularly valuable are his remarks in relation to its employment for bleeding fibroids, he having, on several occasions, on examining specimens of uteri removed by hysterectomy, found a pedunculated fibromyoma within the uterine cavity, which undoubtedly was the source of the symptoms, which could have been removed by vastly milder means. In one case of much interest, where on the question of hysterectomy he differed from a colleague by proposing previous dilatation, a third colleague was consulted who proposed electrical treatment, which was consented to, with the result that after three or four applications a fibroma was expelled by uterine contraction. Many other cases are cited where microscopic sections obtained by curetting, and pronounced to be malignant, were proved to be erroneous, and *vice versâ*. Altogether it is refreshing to have to record a paper on such conservative yet highly scientific lines, in these times of brilliant but frequently unwarrantable surgery.

PREGNANCY COMPLICATED BY UTERINE CANCER.

FROM an extensive personal experience, and the observation of cases cited by others, Olshausen (*Ztschr. f. Geburtsh. u. Gynäk.*, Stuttgart, Bd. xxxvii.) summarises the treatment of this complication in the following practical manner:—"If the fœtus be not yet viable, the mother's interests alone are to considered; also, if the complete removal of the entire growth be possible." In these cases the author recommends, up to the end of the sixth month, total vaginal extirpation of the uterus, the waters previously being drained away. If the entire uterus be too large for this, it must be emptied abdominally, and then removed per vaginam. When the disease is too far advanced to admit of complete removal, the interference must be in favour of the child, and therefore may demand Cæsarean section at the commencement of spontaneous labour.

If, when the case is first seen, the child is viable, the carcinoma still operable, and labour has commenced, delivery should be completed in the best interests of the mother; and, should Cæsarean section be performed, the uterus should be stitched up after the placenta has been removed, and the organ removed entirely by the vaginal route. Abdominal hysterectomy should only be employed in exceptional cases.

PROCHOWNIC'S TREATMENT IN CONTRACTED PELVIS.

LEUSSER records a case, *München. med. Wchschr.*, 1897, No. 30, in which he adopted this line of treatment with success in a woman who previously had had nine difficult labours, and a small but perfectly developed child was born spontaneously in two hours. Prochownic, recognising that the fœtus does not begin to put on fat till the last months of pregnancy, recommended that, in order to restrict the size, a mother with a contracted pelvis should be dieted on food poor in fat but highly albuminous. By this means, after eight to ten weeks, the fœtus, though not enfeebled, remains small, and about the same weight as when the treatment was begun. He was thus enabled to easily accomplish delivery in three cases of contracted pelves.

THERAPEUTICS.

UNDER THE CHARGE OF

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INFLUENCE OF GASTRIC DIGESTION ON THE ACTIVITY OF DIGITALIN.

DEUCHER has made some interesting observations on the effect of gastric juice in modifying the activity of digitalin (*Deutsches Arch. f. klin. Med.*, Leipzig, 1897, Bd. lviii.). It has often been observed that the preparation known as *digitalinum verum*, one of the active principles of the digitalis leaf, is much more active when given subcutaneously than when administered by the stomach. Deucher thought this must be due to changes occurring in the intestinal canal, as digitalin is a glucoside, and can be readily broken up into glucose and another substance. One solution of digitalin was accordingly submitted to artificial gastric digestion, and its toxicity compared with another solution which was not so treated. The two solutions were tested on frogs, and in every case the former was found to have been greatly reduced in toxic power, although it still retained the characteristic digitalis action. It was usually about one-third weaker.

SOLUBLE METALLIC SILVER.

UNDER this title, Liebreich contributes a description of recent researches conducted by Lea, Credé, and others, on a soluble allotropic form of silver (*Therap. Monatsh.*, Berlin, Dec. 1897), and draws attention to its possible therapeutical usefulness. It is well known that silver placed in organic fluids communicates to the solution a brownish colour, due to the silver going into solution. Lea and others have been able to convert this again into the solid metal, and it is now made commercially. The preparation is in small hard pieces with a peculiar greenish metallic lustre, and it can be reduced to a fine powder. When rubbed in an agate mortar, it becomes a tough mass with a lustre somewhat resembling that of gold. If the powdered metal is treated with water it dissolves as a brown solution. Warmed with nitric acid, a whitish opalescence at first occurs, and then it dissolves to a perfectly clear solution. Hydrochloric acid precipitates it as silver chloride soluble in ammonia. Heated in a small platinum capsule, it becomes ordinary metallic silver no longer soluble in water.

Credé has used it by subcutaneous injection, and finds that it remains soluble in the albuminous fluids of the body, and does not produce argyria. At the Moscow Congress he exhibited ascitic fluid holding silver in solution, and thus proved that it is absorbable and non-poisonous. A solution of 1 to 100 can be given subcutaneously to the extent of several grammes without causing any pain. He has also used it in the form of ointment, when it is absorbed through the skin. He believes that it is useful in cases of lymphangitis, phlegmonous inflammations, septicæmia, and scarlet fever, diphtheria, etc., greatly lessening the virulence of the poison. Liebreich thinks that it is well worthy of more extended investigation.

DEATHS UNDER ANÆSTHETICS.

GURLT has collected the available statistics of deaths during anæsthesia, and gives the results as follows (*Arch. f. klin. Chir.*, Leipzig, 1897, Bd. lv.). Altogether, they comprise 330,429 cases, with 136 deaths, distributed as follows:—

Chloroform	240,806	cases,	116	deaths	=	1 : 2075
Ether	56,223	„	11	„	„	1 : 5112
Chloroform and ether . .	15,226	„	2	„	„	1 : 7613
Billroth's mixture . .	6,740	„	2	„	„	1 : 3370
Ethyl bromide . . .	10,793	„	2	„	„	1 : 5396
Pental	631	„	3	„	„	1 : 213

It is scarcely necessary to point out that although such statistical results are no doubt interesting and worthy of being recorded, yet they are only statistics after all, and no account is taken of the different complex factors, such as the condition of the patient, or the severity of the operation, which may contribute to the fatal result. If chloroform is so much more deadly than ether, one would naturally suppose that a mixture of the two would occupy a middle place as regards safety, yet this table would prove it to be very much safer than either of them.

MEDICAL JURISPRUDENCE.

UNDER THE CHARGE OF

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Carbonic Oxide in Blood.

In the *Vrtljschr. f. gerichtl. Med.*, Berlin, July 1897, Dr. E. Michel considers the question of the length of time in which carbonic oxide gas can be found in the blood, and in blood extravasations of persons who survive after being exposed to its action.

He states that little is known as to how long after a person has been exposed to an atmosphere containing CO, the presence of the gas may be demonstrated in the blood. It has been ascertained that within a short time all trace of the gas disappears, notwithstanding the fact that the combination of CO with hæmoglobin is much stronger than that of hæmoglobin with oxygen; but as to how long, after a case of poisoning, the presence of CO can be affirmed, no information is available.

Pouchet states that he has succeeded in finding it in persons who have survived after a period of sixty hours, Koch has demonstrated its presence after ten hours, while Hofmann succeeded in finding certain evidence of its presence in a severe case of poisoning by lighting gas two hours after the person was rescued. Wesche was unable to do so in another case, after a lapse of a similar period. The author instituted a series of experiments on animals (rabbits and cats), which were placed in a glass jar, into which lighting gas was pumped (the percentage of CO in the gas is not stated). After a minute or two, the animal was removed from the jar, and samples of blood were taken from the jugular vein at intervals, and examined for the presence of CO. The maximum length of time at which the gas was found was forty-one minutes, while the minimum period was sixteen minutes after the removal of the animal from the jar. As a rule, in cases where free respiration has taken place, it is only possible to demonstrate the presence of CO within sixteen minutes after removal from the jar. An examination of the muscles gave similar results.

The rapid disappearance of the CO is explained by the experiments of St. Martin, which showed that when blood containing CO was allowed to stand exposed to the air, some of the CO disappears in a few hours, and in the course of a week it may have entirely done so.

Dresser also has called attention to the fact that, even in the most severe cases of poisoning, the oxygen is not wholly displaced by CO in the blood, and that at least 20 per cent. of the blood in the body retains its oxyhæmoglobin intact. Dr. Michel admits that it would not be wise to draw definite conclusions in regard to human beings from experiments on animals, but he thinks it may be held as regards the former, that, even in severe cases of poisoning, proof of the presence of CO cannot be obtained after a lapse of a few hours, if the person has subsequently had an opportunity and been capable of full respiration in the fresh air.

In regard to the proof of the presence of CO in extravasations of blood, it is well known that the CO is retained for a much longer period, and the author's experiments show that it may with certainty be demonstrated until the fifth day after the inhalation of the gas.

SEMEN IN STAINS.

M. ETIENNE MARTIN of Lyons, at the International Medico-Legal Congress held last year at Brussels, communicated a new and rapid method of demonstrating the presence of semen in stains, discovered by Professor Florence of Lyons. The material with the suspected stain is soaked in distilled water, and a drop of the fluid pressed on to a glass slide; a drop of a special reagent, "Florence's reagent" (*iode triiodure*), is then added, and the preparation examined under the microscope. With a low-power objective the rapid formation of numerous yellow-ochre crystals, similar to hæmin crystals, but much larger, is seen; these disappear rapidly, and they dissolve at a temperature of 45° C. This reaction may be regarded as affording great probability of the presence of semen. If the stain has given a positive reaction, a small piece of the material is cut from the edge of the stain and placed in distilled water for an hour. One of the fibres is then detached, placed upon a slide, and a drop of croceine added. With an immersion lens it is seen that the spermatozoa are coloured bright red, and the fibres of the material light pink. The heads of the spermatozoa have an appearance like an acorn, the anterior portions being transparent and the posterior opaque.

THE MEDICO-LEGAL VALUE OF SUBSEROUS ECCHYMOSES.

DR. CORIN, in a paper (*Proc. Internat. Medico-Legal Cong.*) based upon numerous experiments, brought forward a new theory in explanation of the formation of subserous ecchymoses. He showed that they are due to an augmentation of the blood pressure, as a result of excitation of the vasomotor centre; and he considers that the formation, more especially of subpleural ecchymoses, arises from a simultaneous augmentation of the blood pressure and an arrest of the respiration, lasting for a certain time. Subserous ecchymosis proves nothing in favour of death having resulted from asphyxia, although it is most often found as an accompaniment of this form of death. It simply shows that at the point where it is produced an augmentation of the blood pressure has existed, sufficient to overcome the resistance of the perivascular coats. In those cases where the resistance of the vascular coats may *à priori* be supposed to be normal, and where increase of pressure results in consequence, this increase is caused by more or less strong excitation of the vasomotor centre, with an intensified cardiac pulsation, and the simultaneous arrest of respiration for a longer or shorter period, and not as a result of the respiratory effort of Lukomsky. It does not appear, so far as our experience goes, to be even necessary to refer for an interpretation of the lesions to thoracic aspiration (Krahmer), on the principle of the cupping glass, which tends, under ordinary circumstances, to diminish rather than augment the blood pressure.

In the discussion which followed, several speakers disagreed with the views of Dr. Corin, and cited cases in which the existence of subserous hæmorrhages could not be explained by his theory.

A Case of Mushroom Poisoning.

Dr. L. von Wedekind records (*Med. Rec.*, New York, Dec. 1897) the following case:—

The patient, æt. 37, an officer in the naval service, who believed himself to be an expert in the classification of different varieties of mushrooms, swallowed a small portion of a fungus which he supposed to be a variety of *Amanita*, and immediately felt an acute burning sensation in the pharynx. He hurried home, and had gone a distance of about half a mile when he was seized with vomiting and purging. After thoroughly evacuating the stomach and bowels, he fainted, and was found in this condition by some men, who took him home, where he again fainted. The vomiting and purging continued almost constantly for six hours, when he was seen by Dr. Wedekind, who found his pulse to be 120, and the temperature 105°·5, with great prostration. He was given a cold bath, which reduced the temperature to 102°; $\frac{1}{15}$ of a grain of atropine, and later $\frac{1}{30}$ of a grain of strychnine, also $\frac{1}{2}$ oz. of castor-oil and twenty drops of laudanum. The pulse fell to 60; there were constant delirium and hallucinations, profuse perspiration, great thirst, and abdominal pain present.

The condition of high temperature, slow pulse, great gastric irritation, insomnia, delirium, hallucinations with marked asthenia, lasted for four days, after which the acute symptoms subsided, and were followed by a typhoidal condition, with morning remission and evening rise of temperature to 104° and 105° for about one week, when convalescence was established.

A Case of Post-Mortem Delivery.

Dr. Bleich records (*Vrtljschr. f. gerichtl. Med.*, Berlin, October 1897), the following case of post-mortem delivery:—

The body of a woman was found in a river, and on examination she proved to be about six months pregnant. With the exception of some slight injuries on the lower limbs, there were no marks of external violence, and as the case was evidently one of suicide by drowning, no post-mortem examination was held, and the body was buried.

About eight days afterwards, it was discovered that three young men had had connection with her, one after another, shortly before. They contended that this had occurred with the deceased's consent. The body was ordered to be exhumed, and, on opening the coffin and removing the burial clothes, delivery of the child was found to have taken place.

Decomposition was advanced, and the abdomen was greatly distended. Between the thighs lay the inverted and prolapsed uterus, and from the still attached placenta, the umbilical cord, 44 cm. in length, proceeded to the child, which was 36 cm. long, and lay with its head between the knees of the mother and its feet in the direction of her genital organs. The back was turned upwards, and the face and chest downwards towards the bottom of the coffin.

On opening into the abdominal cavity of the mother, an offensively smelling gas escaped, and the intestines were found to be distended with gas, the result of decomposition.

DISEASES OF THE EAR, NOSE, AND THROAT.

UNDER THE CHARGE OF

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THE following is an abstract of some of the more important subjects discussed in the sections of Laryngology and Otology at the Twelfth International Medical Congress, Moscow, August 1897, and at the British Medical Association, Montreal, September 1897.

CANCER OF THE LARYNX.

THE great importance which is attached to the diagnosis and treatment of malignant disease of the larynx, and the interest excited in it, are evidenced by the fact that, both at Moscow and Montreal, the subject was brought under the notice of the profession. During the last year important additions have been made to literature, notably by Sendziak of Warsaw, in his monograph, "Die bösartige Geschwülste des Kehlkopfes," 1897, and in a long paper by Schmiegelow in the *Ann. d. mal. de l'oreille, du larynx, etc.*, Paris, 1897. In both of these publications the subject is dealt with very fully, and much valuable information may be obtained from their perusal. At the German Surgical Congress, held in Berlin in the spring of last year, Graf recorded the results of all the radical operations performed in von Bergmann's clinique since 1883, an account of which was tabulated by Mr. Alexis Thomson in this Journal for September 1897.

We are indebted to the *Journ. Laryngol.*, London, and to the *Monatschr. f. Ohrenh.*, Berlin, October, November, and December 1897, for the proceedings of the Moscow Congress.

Chiari of Vienna introduced the discussion at Moscow in a "Report on the Present Position of the Diagnosis and Treatment of Carcinoma Laryngis," based largely upon seventy cases under his own observation.

In discussing the question of the diagnosis of laryngeal cancer, it is doubtful if any fresh light has been thrown upon it; no one symptom or sign can be looked upon as pathognomonic; probably there has been a tendency recently to show the unreliability of certain diagnostic points, which have previously been looked upon as useful. Impaired mobility of one vocal cord, always a valuable sign in diagnosing between benign and malignant growths, was found by Bryson Delavan to be entirely absent in a well-marked epithelioma of the anterior half of one side of the larynx, and it is stated to be just as frequently present in pachydermia; while hoarseness, one of the earliest and most constant symptoms of laryngeal cancer, may be present for many months in affections of the cords of quite a simple nature.

There was considerable expression of opinion with regard to microscopical examination of portions of the growth previously removed; if the clinical symptoms and signs favour cancer, a negative histological result is of no value. On the other hand, provided that the microscopist is a man of experience, a positive microscopical result should outweigh all negative clinical evidence. The only thoroughly reliable means of diagnosis between cancer, papilloma, pachydermia, tuberculosis, and syphilis, Chiari concluded, was by the help of the microscope, and in this latter view he was supported by Krause.

The general feeling expressed at the meeting was upon the valuelessness of *negative* microscopic results, more than one case being reported in which the tumour was pronounced by the pathologist to be simple, sometimes even after more than one piece had been removed, the cases proving to be malignant at no very distant date. The fact must not be lost sight of, that the piece removed by the forceps may be of insufficient size, or may not include the whole thickness of the growth. Unquestionably, operative technique has improved of late years, and were an earlier diagnosis made possible, the results of operative interference in malignant disease of the larynx would be more encouraging.

Three methods of operating were considered—laryngo-fissure, with removal of the infiltrated false or true cord; partial excision; and total extirpation of the larynx. Chiari had obtained best results by the first method, in which restoration of voice and free respiration could be effected. An early diagnosis, with limited extension of the disease, is necessary for a favourable result by this means. Krause of Berlin reported fourteen cases of his own, treated by total extirpation, with only one death. By stitching the upper end of the trachea to the skin in front, and thus completely shutting off the pharynx, as first suggested by Solis Cohen, he succeeded in obtaining this result.

In a paper read at Montreal by Bryson Delavan of New York (*Brit. Med. Journ.*, London, Nov. 27, 1897), some pertinent remarks are made as to the value of an early tracheotomy, preliminary to excision of the larynx; he discusses the question on physiological, pathological, and surgical grounds. The sudden elimination from the process of breathing of almost the whole of the upper part of the respiratory tract, the exposure of the trachea and bronchi to air, thus deprived of suitable preparation, and the sudden increase in the amount of oxygen inspired in a person who may have previously suffered from marked stenosis of the larynx, tend to disturb the patient, and hence, at the time of the major operation, and afterwards, he should be relieved from such as much as possible by an early tracheotomy. He claims, as an additional advantage of an early tracheotomy, the amelioration of the local condition by complete rest; the subsidence of congestion thus induced gives an opportunity for a more ready distinction between diseased and healthy parts, a matter of no small moment both to the patient and the surgeon. From the surgical point of view, in addition to the time saved and the more easy administration of the anæsthetic, he brings under notice a point of great practical importance. After preliminary tracheotomy, considerable cicatricial adhesion takes place between the walls of the trachea and the wound in the neck; if, in such a case, after removal of the larynx, the upper end of the trachea is brought out and stitched to the opening in the neck, there is already a certain amount of fixation present, so that with proper sutures the trachea will hold to the soft parts.

The author cites a case in which this method of extirpation had been employed without any preliminary tracheotomy; and, when the edges of the trachea were stitched to the cervical wound, there was such free movement of the wound with respiration that the sutures failed to hold the parts in apposition, and the operation was a failure. On the above grounds he suggests that the tracheotomy should be performed, at the very least, ten days before the major operation.

As Schmiegelow's recent paper has already been referred to, it would not be out of place to quote here some of his statistics.

In seventeen cases of intralaryngeal cancer coming under his personal observation, fifteen being males and two females, operation was performed in twelve. In one, total extirpation of the larynx was performed, death from pneumonia following three days after the operation; in three, a partial excision was carried out, consisting in removal of the right or left half of the thyroid cartilage, and in two of the three cases removal of the corresponding arytenoid cartilage also. In these twelve cases, death occurred in four, eight and ten months after operation, from recurrence of the disease. In the eight remaining cases, the larynx was opened in the middle line, and as much of the diseased portion as was recognised was dissected off; the disease in the majority of the cases affecting one or other true vocal cord, with occasional involvement of a neighbouring portion of the mucous membrane. In three of these, death took place within a few months of the operation; in one, there had been no recurrence at the end of the four years; while in the remaining four no further statement is made beyond the fact that recovery from the operation resulted.

LARYNGEAL TUBERCULOSIS.

THE progress made in the treatment of laryngeal phthisis, since the meeting of the Congress in Rome in 1894, was discussed in the section for Diseases of the Larynx and Nose. As we entered at considerable length into the medical treatment of laryngeal tuberculosis in this locality in the *Edin. Med. Journ.*, May 1897, and dealt there with the use of some of the more recent medicinal agents, we will confine our remarks to the surgical aspect of the treatment under discussion, dealing specially with the *cupric electrolysis* of Dr. Scheppegrell (*Journ. Laryngol.*, London, October 1897). He found that the oxychloride of copper possessed marked germicidal properties, and that it stimulated the tissues to a healthy reaction. After producing cocaine anæsthesia in the larynx, he introduced spherical bulbs of pure copper, one-eighth to one-fourth of an inch in diameter, attached to an insulated handle, and connected with the positive pole. The copper bulbs were applied directly to the tissues, an electrode connected with the negative pole being placed on the back of the neck. A current of 1 to 3 milliampères was used for three to ten minutes, and the operation was repeated every two or three days. The copper in connection with the tissues is electrolysed, and the oxychloride of copper passes into them. The advantages which he claims for this method of treating tuberculosis are summarised as follows:—

1. There is no real destruction of the tissues, and no laceration of the surfaces which might form a point of entrance for new pathogenic germs, as is the case with curetting, and, to a certain extent, also with galvano-cautery and simple electrolysis. The cure is effected by the healthy reaction of the tissues, in the same manner as we often see specific lesions heal when the system is under the influence of mercurials.

2. In the cases thus treated there had been no reaction or hæmorrhage after the application, a point of great importance with tubercular patients.

3. The method does not demand the high degree of manipulative skill required for curetting, and the electro-cautery in the larynx, and is especially simple when autoscopy can be used.

4. The method is applicable to all cases of laryngeal tuberculosis.

In two of three cases that were detailed, the ulceration was cured and the infiltration diminished before treatment was discontinued, on account of the aggravation of the pulmonary disease; while in the third case, in which no lung disease could be detected, though tubercle bacilli existed in the sputum, and in which the larynx was infiltrated and ulcerated, cure took place in eight weeks, and six months later there was no evidence of any recurrence.

In connection with this subject, Dr. Leduc of Nantes showed a simple instrument which he had introduced, by means of which the patient could himself apply powders or liquids to the larynx. It consisted of a glass tube, about 6 mm. in its interior diameter and about 20 to 25 cms. long. At one end a piece about 1 cm. long was bent to an angle of 100°, while at the other end a piece about 4 cms. in length was bent to an angle of 145°. The short bent piece is introduced into the mouth as far as the posterior wall of the pharynx, while the longer bent end protruding from the mouth rests on a plate containing the powder, or in a wine-glass containing the prescribed liquid. When the patient inspires, the powder or liquid passes into the larynx and trachea without coming into contact with the mouth or pharynx. The author recommends the instrument, on the ground that the patient can himself make the application as often in the day as may be necessary, and with the certainty that it reaches the larynx.

TURBINOTOMY OR TURBINECTOMY.

THE vexed question of turbinotomy, so called, formed the introductory discussion in the section at the Montreal meeting. It is a subject which has already received very considerable attention, both in the journals and at the meetings of societies in this country, but additional interest was raised in it on this occasion by the presence of several well-known American specialists, from whom some expression of opinion upon this method of relieving nasal obstruction was expected. The balance of opinion generally was against the complete removal of the inferior turbinated bodies. We may be allowed to quote the following words of the president, Dr. Greville MacDonald, who introduced the discussion (*Brit. Med. Journ.*, London, Nov. 13, 1897). After making some remarks upon the hypertrophied conditions found in the nose, and upon the removal of part of the enlarged inferior turbinal, by paring with scissors, or with scissors and snare, he continued: "It is only the anterior portion that ever needs such treatment, in my experience, and I have never seen any case where it was necessary to do more than this. I have never been tempted to remove large portions of the inferior turbinal, beyond the masses of hypertrophy with which we are all so familiar. And although I have heard the views of those who advocate the larger operations on the inferior turbinal, for the relief of obstruction to respiration, or for the removal of certain neuroses, yet, while amply convinced of the feasibility of such operations, and of the relief they may afford, while even admitting that no appreciable harm may result in most cases, yet, let me repeat, I have, for my part, not seen the cases where the desired relief could not be acquired by milder measures."

Dr. Delavan of New York expressed the view that the subject was one of great importance, on account of the necessity for checking a practice at once unscientific and objectionable. He considered that the use of the "spokeshave" in nasal surgery was inadmissible, as we were already possessed of ample means for securing all necessary results in a better, safer, and more conservative way. In most cases the necessary relief was obtained by simpler means than this, and that being the case, a complete destruction of tissues, so valuable in the process of respiration, was hardly called for. Somewhat similar views were expressed by other speakers. Dr. Daly of Pittsburg referred to the use of turbinotomy in children, on whom he had performed the operation several times. Where no other cause of nasal obstruction existed, and where the turbinated bodies seemed to be the cause of the difficulty, as much of them as appeared necessary was removed.

MASTOID SUPPURATION.

SOME interesting points were brought out by Dr. Clarence J. Blake of Boston in a discussion upon the "Ultimate Results of Operations on the Mastoid." In five acute cases of mastoid suppuration, in which there was associated caries of the cell walls and redundant granulations, primary healing occurred within a few days after the operation.

After opening in the usual way, and scraping the diseased contents, the cavity was allowed to fill with blood, the edges of the wound in the soft parts were sutured together, and an aseptic gauze dressing was applied. One case was discharged well in seven days, one on the eighth day, two on the tenth day, and one on the twelfth day. They were all kept under observation in the out-patient department for two or three months, and they remained healed without symptoms of the recurrence of mastoid trouble. An attempt to obtain primary healing in six other acute cases failed, and only failure could be recorded in all the chronic cases. No harm can be done by making the attempt to obtain healing in this way, since, if the blood clot breaks down, the stitches can be easily removed and the wound allowed to heal by granulation. Cultures were made from the pus, in order to determine the character of the infection. Out of thirty-seven cases thus examined, in twenty-three only one germ was found, namely, in twelve cases a pure streptococcus, in five a pure staphylococcus, and in six a diplococcus; in twelve there was a mixed infection, as follows:—In six, streptococcus and diplococcus; in three, streptococcus and *Bacillus fœtidus*; in one, streptococcus and *B. pyocyaneus*; and in one, streptococcus, staphylococcus, and diplococcus. The streptococcus cases were by far the most serious.

PUBLIC HEALTH.

UNDER THE CHARGE OF

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ASIATIC CHOLERA, CHOLERA NOSTRAS, AND DIARRHŒA.

In the supplement to the Twenty-fifth Annual Report of the Local Government Board, Klein contributes the results of an investigation into the relations of Asiatic cholera and cholera nostras. During 1893 several cases occurred in England which clinically, pathologically, and bacteriologically were recognised as true Asiatic cholera, although in some of these there could be no connection traced, direct or indirect, with antecedent cases. During the same period, isolated cases (two fatal) appeared in various localities, having all the leading clinical features of Asiatic cholera, in which the comma bacillus could not be found. Hueppe, during the Hamburg epidemic, met with similar cases. From the administrative as well as from the epidemiological point of view, it is most important to ascertain whether Koch's bacillus is always absent in the casual cholera cases occurring in summer and autumn, when the presence of exotic cholera is practically out of the question.

During the summer and autumn of 1894 and 1895 there were no series of cases of cholera in any part of England, not even in the localities which had been infected in 1893, and there was no known importation of cholera from abroad. Nevertheless, during the summer and autumn of these years twenty-nine cases of severe diarrhœa (twenty-two fatal) were reported to the Board, some of which, in their onset, rapidity of course, and general clinical and pathological characters, were so strikingly similar to Asiatic cholera, that the medical attendants and medical officers of health made the provisional diagnosis of them as such. In all these cases Klein examined the stools, and in the fatal cases a part of the ileum and its contents, and while he found in nearly all of them crowds of *B. coli*, and in most of them *B. proteus*, he failed to find the comma bacillus in any. In seven of the cases (five fatal) the bowel contents consisted of a watery fluid, in which there floated mucous flakes composed of leucocytes and detached epithelial cells similar in appearance to those found in true cholera stools. Further, as in the latter disease, these flakes contained almost pure cultures of one bacillus arranged in rows or lines, but in six of them it was *B. coli* and in one *B. proteus*. He considers that the presence of great numbers of these bacilli in the small intestine, by setting up fermentations in the albuminoids resulting in toxin formation, may probably be the cause of cholera nostras.

In the same supplement he contributes the results of the bacteriological examination in connection with an epidemic outbreak of severe diarrhœa in St. Bartholomew's Hospital. There were fifty-nine cases—all in one day and all among the patients. In most cases there was no vomiting, and the stools were watery, offensive to smell, and contained a considerable amount of mucus, and sometimes blood. Microscopic examination of the stools showed numerous spore-bearing bacilli. By anærobic culture in grape-sugar gelatin and grape-sugar agar he isolated a rod-shaped bacillus, either single or in short chains, and having as a rule a terminal spore. It coagulates milk. After incubation for three or four days, the gelatin is liquefied, gas bubbles are formed, and the culture smells of butyric acid. Young cultures injected into the peritoneum, or subcutaneously into guinea-pigs, cause death in six to twenty hours. With the exception of its pathogenic action, this bacillus resembles Botkin's bacillus of butyric acid. Klein has given it the name of *Bacillus enteridis sporogenes*. The only article of food partaken by all those attacked was milk. In a sample of this milk the same anærobic bacillus was found.

Public Laundries and Infected Linen.

M. Vallin (*Rev. d'hyg.*, Paris, tome xix. No. 11) submits a report on this subject to the Municipality of Paris. In that city, as soon as an infectious disease is notified, a member of the disinfecting staff is sent to the infected house with a bag to receive the linen soiled during the disease. This is removed at stated intervals, another bag being left in its place. The linen is disinfected and then sent to the laundry. Though considerable advantage is taken of this measure (in 1896, 10,000 of such disinfections were made), many have objected to it, on the ground that stains, *e.g.* of blood or fæces, are fixed in the fabric during steam disinfection. This is now obviated by such stains being removed by rubbing and rinsing in water previous to disinfection, which may easily enough be done in the house before the linen leaves it.

But great danger may arise from soiled linen in such diseases as tubercle, suppurations, diarrhœa, etc., which are neither notifiable nor considered by the general public to be infectious. This necessitates certain precautions with all linen sent to public laundries. The most dangerous operation is sorting out the articles prior to washing. He recommends—(1) That the bag containing the soiled linen be washed each time it comes to the laundry, and the clean linen returned in it. (2) The sorting process be done in a separate room cut off from eating or sleeping apartments. (3) Each bag to be opened under a fine spray of water, so as to sufficiently moisten the clothing, and thus prevent the escape into the atmosphere of any dust containing micro-organisms during the process of sorting them out.

THE GROWTH OF TYPHOID BACILLUS IN THE SOIL.

DR. SIDNEY MARTIN (Supplement to Twenty-sixth Report of Local Government Board, England) gives a preliminary report on this subject. His object was to ascertain, under different conditions of moisture, temperature, and organic pollution, what soils are favourable and what are inimical to the existence and growth of this bacillus. Two kinds of soil were used, one highly polluted made soil, and the other virgin soil, which had never been under cultivation, and consisted of an upper layer of peaty soil with sand beneath. The soil was sifted, dried, and ground to a powder, and sufficient to cover the bottom of an Erlenmeyer flask to a depth of 1 to 2 in. was used in each experiment. Water was added to give a moisture of about 36 per cent., and flask and contents sterilised. The surface of soil in each flask was about 3 in. in diameter, and had no free water on it, and it was inoculated in the centre sometimes with an agar and sometimes with a broth culture of the bacillus. Without entering into details of each experiment, the following are, broadly speaking, the results :—

In contaminated soil incubated at 37° C. for sixteen days, the bacillus had not only lived, but in two out of four cases had grown through the whole mass; while in a second series of experiments, after 105 days it was found with all its cultural characteristics in every part of the soil. *B. coli*, inoculated and incubated in the same way, had grown through the whole soil in twenty-eight days. Incubated at room temperature, *B. typhosus* was living and active in the centre of the soil after fifty-three days, though it had not yet spread through the soil. In virgin soil the results were very different. Whether incubated at the higher or lower temperature, no typhoid bacillus was found in the soil when examined after fourteen and twenty-three days. *B. coli* behaved quite similarly. As the author states, it is of importance to investigate the relation of these organisms to non-sterilised soil.

POISONING BY FOOD.

SEVERAL researches have been published of late. Van Ermengem (*Ztschr. f. Hyg.*, Leipzig, Bd. xxvi. Heft 1, and *Rev. d'hyg.*, Paris, tome xix. No. 10,) discusses this subject at considerable length.

In a village in Belgium a number of persons were suddenly attacked with severe illness after eating raw ham. All who had partaken of the food were affected, ten of them very seriously, and among these there were three deaths. In three cases the symptoms appeared shortly after the meal, but in most of them only after twenty to thirty-six hours. The symptoms were, great gastric disturbance, with repeated vomiting and marked constipation, though in two cases there was diarrhœa. There was loss of vision, the pupils widely dilated and insensible to light, with ptosis of both eyelids. There was burning thirst, a feeling of constriction in throat, and difficulty in swallowing even fluids. The mucous membrane of nose, mouth, and pharynx was injected, and covered with thick greyish mucus, the voice being hoarse and articulation difficult. The circulation, respiration, and temperature were not, as a rule, much affected, and the mind was quite clear. In all cases great muscular weakness was complained of. In the fatal cases there was collapse and dyspnœa, with small and irregular pulse, before the fatal issue. *Post-mortem.*—There was hyperæmia of the kidney and of the membranes of the brain, and fatty degeneration of the liver. Ordinary plate culture of the organs showed no uncommon form of microbe, but by anærobic culture from the spleen he got a spore-bearing bacillus which subsequent investigation showed to have a direct causal relation with the disease.

The following points regarding the ham which was eaten are interesting. The sow had been slaughtered twelve days previously, and portions of the flesh eaten then had caused no disease. The rest had been salted in a tub twenty-four hours later, with the usual precautions, and much of this, including one of the hams, had been eaten without harm. The remains of this ham showed putrefaction in various parts. The ham which caused the disease was at the bottom of the tub, and was the only part that had been immersed in the brine. It had a slightly rancid smell, but no appearance of putrefaction. Microscopic examination showed groups of free spores of bacilli, and anærobic culture showed at different parts numerous spore-bearing bacilli, the same as those found in the spleen of the fatal case already described. The flesh itself, or a maceration of it, whether given by the mouth or subcutaneously injected, produced in animals symptoms very similar to those observed in the epidemic. When this maceration is filtered through porcelain, it is quite as active as when unfiltered, showing that the disease is not due to the action of the microbe in the living body, but to a toxin preformed in the ham. As to lethal dose, ·01 c.c. to ·05 c.c. killed after eighteen to twenty-four hours, the latent stage being often ten to eighteen hours. The bacillus, which has been called *Bacillus botulinus*, is obligate anærobic, slightly motile, with terminal spores, and, on culture in dextrose gelatin, produces much gas and smells of butyric acid. It is saprophytic, and at 37° C. very soon undergoes involution.

The term *botulismus* (sausage-poisoning), van Ermengem thinks should be extended to all food intoxication, whether by sausages, ham, tinned meat, salted fish, or other preserved food, whose method of preparation exposes it to the danger of anærobic fermentation, and in which the above is, broadly speaking, the clinical picture. It is carefully to be distinguished from food intoxication by putrefactions of albuminoid matter brought about by such organisms as *B. proteus* or *B. coli.*

M Dineur (*Arch. méd. belges*, Bruxelles, tome xix. fasc. 3) relates an epidemic of poisoning by sausages which occurred in a barracks. Seventy-six persons were attacked, and all recovered within two days. The symptoms were vomiting, diarrhœa, fever, colic, mydriasis, together with an eruption on the skin. Culture of the sausages, both aërobic and anærobic, showed crowds of *B. coli*, and to them he attributed the attack.

Dr. Scheef (*Med. Cor.-Bl. d. württemb. ärztl. Ver.*, Stuttgart, October 1897) describes a somewhat similar epidemic due to sausages. There were 150 cases. The only nervous symptom was severe headache, and in one case delirium. There was severe diarrhœa and vomiting, fever with burning thirst, and severe muscular pains. Those who ate the sausages raw suffered more than those who partially cooked them. The sausages had been made from the flesh of a calf known to have suffered from a disease, probably of a septic nature. Some of the veal had been eaten, and produced the same symptoms as the sausages. Bacteriological examination showed the presence of *B. coli*, and an organism almost identical with the *B. enteritidis* of Gärtner. Scheef considers this a case of infection by bacteria, and not of true botulismus.

In the Supplement to the Twenty-sixth Local Government Board Report, Dr. Buchanan gives an account of an epidemic (265 cases, with no deaths) from eating potted meat. The symptoms were almost the same as in the last two epidemics described, and their severity had no relation to the amount eaten. The incubation period varied much, but was in most cases from twelve to twenty-four hours. There seemed no reason to believe that the flesh from which the potted meat was made was in any way diseased, and no means by which the potted meat could have got subsequently infected were discovered. A substance called "Indian red" had been mixed with the minced meat to improve its colour. This substance, on analysis, was found to contain about 90 per cent. of bicarbonate of sodium, and about 10 per cent. of a colouring matter derived from coal tar. There was no reason to attach blame directly to this substance. Dr. Buchanan thinks it improbable that the poisonous substance was produced in the potted meat, and inclines to the view that the disease was caused by infective bacilli carrying on their processes in the living body. Bacteriological examination by Dr. Klein showed that microbes were present in the potted meat in quite an unusual number, among which *B. coli* and *B. proteus* were very prominent. The bicarbonate of soda in the potted meat might have made the gastric juice alkaline, and permitted the *B. proteus* to pass into the duodenum and small intestine, and there develop its toxins.

REPORTS OF THE MEDICAL SOCIETIES.

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Edinburgh Medico-Chirurgical Society—Clinical Meeting.—21*st December* 1897.—Dr. Batty Tuke, President, in the chair. Exhibition of Patients.—(1) By Dr. MacGillivray, a patient after excision of part of the transverse colon for malignant tumour. (2) By Dr. John Thomson, a case of tremor of the left arm of a child. (3) By Dr. James, two cases of irritation of the lumbar region of the spinal cord, due to peripheral bone lesions. (4) By Dr. Affleck, a patient after operation for pyloric stricture due to gastric ulcer. (5) By Mr. Hodsdon, a patient, æt. about 4, after operation for acute strangulation of the bowel from a band. (6) By Dr. Stewart Stirling, a case of lupus vulgaris. (7) By Mr. Cotterill, a case showing multiple lipomata of the forearms, with an unusual amount of pain. (8) By Dr. James Carmichael—(*a*) a case of pseudo-rachitic paralysis; (*b*) a case of hemiplegia in a child, due to meningeal hæmorrhage; (*c*) a case of infantile paralysis.

Exhibition of Specimens.—(1) Dr. Affleck showed a specimen from a large, waxy liver, the cause of which was not discovered. (2) Dr. Affleck and Dr. Bruce showed (*a*) section of the spinal cord from a case of cervical tabes dorsalis; (*b*) the scapulæ and humerus from the same case, showing Charcot's absorption; (*c*) sections of the cord and muscles from a case of pseudo-hypertrophic paralysis. (3) Dr. Bruce showed (*a*) sections of the medulla from a case of syringomyelia, with atrophy of the root of the glosso-pharyngeal nerve and of the fillet; (*b*) a specimen showing hæmorrhage from the middle lobe of the cerebellum into the fourth ventricle; (*c*) a cast of the œsophagus from a case of carbolic acid poisoning; (*d*) the stomach and intestine from a case of poisoning with 1 to 20 carbolic lotion. (4) Mr. Alexis Thomson showed (*a*) a hydronephrotic kidney removed by lumbar incision; (*b*) a calculus which had been impacted in one of the ureters. (5) Prof. Chiene showed (*a*) a cast and preparation of old-standing appendicitis; (*b*) a renal calculus; (*c*) gall stones which caused complete intestinal obstruction. (6) Mr. Cotterill showed (*a*) a specimen of cylindroma of the brain; (*b*) a specimen of malignant pustule, from which, however, the *Bacillus anthracis* had not been obtained. (7) Mr. Wallace showed (*a*) a catheter removed from the bladder; (*b*) a uric acid calculus removed by suprapubic cystotomy, after attempts to crush with the lithotrite. (8) Mr. Cathcart showed (*a*) a simple solid epithelial tumour of the skin; (*b*) two specimens from cases of recurrent appendicitis; (*c*) a dissection of the arteries of a leg after amputation for senile gangrene. (9) Dr. Shennan showed (*a*) part of a triradiate tænia saginata; (*b*) an injected specimen showing gangrene of the leg. (10) Mr. **Caird** showed a specimen of osteo-sarcoma of the femur. (11) Mr. **Thomson** showed for Dr. **MacGillivray** a large compound cystic ovarian tumour.

19th January 1898.—Sir **John Batty Tuke**, President, in the chair. Dr. **Joseph Bell** congratulated the President on the honour of knighthood recently conferred upon him.

Mr. **Annandale** showed—(1) Calculi removed from the bladder; (2) renal calculus *in situ*; (3) cancer of the rectum, from a patient æt. 16; (4) an ankylosed elbow-joint, with buried ulnar nerve; (5) some cases of fracture.

Dr. **John Thomson** showed a tubercular mass in the brain, which had caused unilateral tremor in the left arm.

Dr. **Bruce** showed a specimen of aneurysm of the aorta, which ruptured into the left bronchus.

Dr. **Shennan** showed—(1) Specimen of larynx and trachea, showing diphtheritic membrane; (2) gall stones impacted in the common bile duct.

Dr. **Rainy** showed a specimen of achondroplasia.

Dr. **Bruce** and Mr. **Stiles** read a paper on draining the fourth ventricle for acquired hydrocephalus, from syphilitic meningitis in a girl of 16. There was retraction of the head, irregular temperature, and slight squint. There was never any vomiting, and no tubercular history could be got. Just before the operation she had a rigor, followed by cyanosis. A curved incision was made, extending from one mastoid process to the other, with the middle of the curve at the level of the external occipital protuberance. The ledge of the foramen magnum was exposed. A disc of bone was removed above the foramen magnum; the dura mater was incised and reflected. Several ounces of fluid escaped. Large quantities of fluid continued to escape up till the day of the patient's death. There was no shock after the operation, and the temperature continued normal for four days, and then rose again. Mental improvement continued till the end. The patient died of marasmus. Fifteen cases have been recorded in which this operation has been performed, and in five a cure followed.

Dr. **John Thomson** then read his paper on the "Diagnosis and Prognosis of Imbecility in Infancy." The paper was illustrated by a lantern demonstration of photographs. Dr. **Thomson** mentioned that mental defects in children were often accompanied by physical defects, and went on to describe the forms of imbecility under various heads—(1) Microcephalus idiots; (2) chronic hydrocephalus; (3) mental defect accompanying paralysis; (4) Mongolian or Kalmuc imbeciles; (5) cretinism; (6) achondroplasia; (7) eclamptic idiocy.

Edinburgh Obstetrical Society.—*12th January* 1898.—Dr. **Milne Murray**, Vice-President, in the chair.—Specimens were shown by Professor **Simpson**, Dr. **Haultain**, and Dr. J. W. **Ballantyne**.

Dr. J. W. **Ballantyne** read a communication on "The Occurrence of a Vitelline Placenta in the Human Subject." He described in detail a sympodial monster which he had dissected. It showed the absence of all structures which are normally derived from the allantois. He found the chorion was vascularised by the omphalo-mesenteric vessels, and chiefly from this fact concluded that the maternal portion of the placenta was vitelline in origin in this particular case. Dr. Ballantyne endeavoured to support his theory that it was possible for the human placenta to be derived entirely from the umbilical vesicle, and to be vascularised by the omphalo-mesenteric vessels alone. Further, he advanced the view that this absence of the allantoic structures was the cause of the variety of monsters known as sympodia, and he also believed that in other varieties of monsters the placenta was frequently devoid of structures derived from the allantois.

ROYAL MEDICAL SOCIETY.—*19th November* 1897.—Dr. PORRITT in the chair.—Dr. BALLANTYNE delivered his presidential address on "The Importance of the Physical Sciences in the Study of Medicine," in which he dealt with diseases as the results of morbid chemical changes. Even in healthy animals, the albumins of the liquor sanguinis are not of a constant composition. Toxins and antitoxins are decomposition products of albumin, produced by the action of bacilli. In cancer, the cachexia was the result of a general poisoning by cancerine, which could be separated from the urine of a patient suffering from this disease. It was from the study of medicine, by the use of the physical sciences, that a solution might be got of the problem, "What is the rational treatment of disease?"

Mr. F. S. L. ROSE described a case of septic peritonitis, following labour in a woman, æt. 23, who suffered from a Bartholinian abscess, which six days previous to her confinement was opened. The placenta was removed by introducing the hand. Symptoms of peritonitis set in on the second day of the puerperium, but recovery took place. Mr. A. M'INTOSH showed a specimen of a large fibroma of the mamma removed from a woman, æt. 40. Mr. R. F. M'NAIR SCOTT described a breech case, with special reference to the unsuccessful means adopted to save the life of the child.

26th November 1897.—Dr. T. A. Ross in the chair.—Dr. G. L. CHIENE delivered his presidential address, choosing as a text for his remarks, "Moderation in all Things." He described the various types of students of medicine he had known, using as a basis for his classification their individual immoderations. Moderation should be exercised in the judgment of others, for what we conceived to be failings in others were not infrequently due to failings in ourselves.

Dr. E. E. PORRITT read a dissertation on the diagnosis of enteric fever, advocating the adoption of a systematic method of examination, with special attention to temperature and pulse. The rash was apt to disappear from the cutis anserina, caused by exposure to cold; thus it was important to examine for it immediately on removing the coverings. Ehrlich's diazo reaction, although not pathognomic, was of great value as a negative sign. As to Widal's serum test, all cases in which the reaction was not obtained had ultimately been proven not to be cases of enteric fever.

Mr. J. M. BOWIE described a case of fracture of the lower end of the femur, illustrating his case with radiographs and photographs. After operative interference, union of the fragments was obtained and the limb saved with an ankylosed knee-joint.

10th December 1897.—Dr. G. L. Chiene in the chair.—"The Prospects of a Recent Graduate" was the subject on which Dr. E. E. Porritt delivered his presidential address. The merits and demerits of the various prospects which were presented to the young medical man on the threshold of his professional career were fully entered into.

Dr. A. H. Watt described the case of a man, æt. 58, presenting considerable difficulty in diagnosis. He had been steady in his habits. Whilst walking home he became suddenly giddy and fell down. When seen he was sensible, but suffered from headache and efforts to vomit. He had slight difficulty of articulation, but was not aphasic, and had no paralysis or anæsthesia; his breathing was normal. Fifteen minutes after being seen, his speech gradually slurred from motor aphasia, his breathing was stertorous, his pupils were contracted, and ceased to react to light; he suffered from complete bilateral paralysis. His temperature, which had been subnormal on admission, rose until it reached 106° F. at the time of his death, ten hours from the commencemen of his illness. The diagnosis of cerebellar hæmorrhage was made, and on post-mortem examination this proved to be correct.

The second communication was on a case of syringomyelia, the changes in the spinal cord being demonstrated microscopically.

Dr. C. M. Cooper described the case of a young primipara who began to suffer from eclamptic convulsions eight hours after delivery. In character the fits had short tonic, followed by clonic, convulsions. Between the fits she was in a semicomatose condition. She suffered from albuminuria without œdema. Rapid recovery took place under stimulation of the emunctories, application of hot digitalis fomentations to the loins, and complete anæsthesia with chloroform for four hours.

Mr. A. Goodall described a case of exophthalmic goitre.

7th January 1898.—Dr. Porritt in the Chair.—Dr. Forbes read a dissertation on "Functional Disorders of the Heart," dealing with tachycardia, bradycardia, arrythmia, palpitation, and cardiac pain. Dr. R. D. Purvis showed a specimen of a brain with a glioma of the right frontal lobe, in a man, æt. 25, who had suffered from severe frontal headache, weakness, and lassitude, double optic neuritis, left homonymous hemianopia, and delusional mania. Operation was performed over the right frontal region, but without success.

Dr. Goldie gave a communication on "Oöphorectomy." He first considered the steps of the operation, and then mentioned the various diseases for the relief of which this operation had been performed, and the results obtained in each case.

Glasgow Pathological and Clinical Society.—13*th December* 1897.—Dr. Donald Fraser (Paisley) in the chair.—Professor Sir Wm. Gairdner showed a specimen of chronic aortic endocarditis, with a small aneurysm, which bulged into the infundibulum of the right ventricle. The physical signs were those of the valve disease. There was, however, a well-defined suspicion of aneurysm arising from certain clinical peculiarities of detail—(*a*) Anomalies of murmur and sound; (*b*) suspected abnormal dulness at base; (*c*) marked tachycardia, in excess of what is to be expected in a lesion of the aortic valve. The patient was a man, æt. 26, and the disease, as far as the onset of the existing symptoms were concerned, arose from a strain eight weeks before admission, followed immediately by an uncomfortable beating of the heart. No history of rheumatism, syphilis, or constitutional predisposition could be ascertained. Tendency to anginous attacks, aggravated by exertion and by alcohol; slight œdema. Pulse remained hyperdicrotic all through illness. Urine contained slight albumin. Temperature normal. Treatment consisted in the administration of the usual cardiac tonics. Death was sudden. The chronic endocarditis found post-mortem had probably existed for a long time, but the small aneurysm was no doubt the result of the strain.

Dr. George T. Beatson narrated three cases of epithelioma of the tongue, two associated with leucoplakia, the third with syphilis. Microscopic specimens and microphotographs were shown on the screen.

Dr. R. S. Thomson showed a specimen of intestinal sand (sable intestinal) from a young woman, the subject of dilatation of the stomach. Constipation was prominent, and enemata had to be given. The sand weighed as much as 6 to 8 drms. on several occasions when dried. As part of her treatment the patient was taking a good deal of lime-water. Dr. Alec R. Ferguson described the chemistry of the condition. Its inorganic basis (80 per cent.) was found to be calcium, mostly in the form of carbonate and phosphate. The organic basis (20 per cent.) was apparently some derivative of bilirubin.

Dr. Joshua Ferguson showed a specimen of diverticulum of the stomach, situated in the greater curvature near the cardiac orifice.

Card specimens were shown by Professor Stockman—photographs and skiagraphs of a case of hypertrophic pulmonary osteo-arthropathy; by Dr. L. R. Sutherland—(1) Typical epithelioma of skin; (2) two specimens of greenstick fracture; (3) a series of specimens illustrating the pathology of perforating ulcer of the stomach and duodenum.

Glasgow Medico-Chirurgical Society.—10*th December* 1897.—Dr. George S. Middleton, President, in the chair.—Dr. William R. Jack showed a case of "maladie des tics," and read a paper on this rare affection. He also showed a case of tic convulsif of the common variety, and contrasted the two affections.

Dr. J. Lindsay Steven showed a boy with a peculiar spastic gait, the exact nature of whose illness was not very apparent, but was considered by some members of the Society as probably myopathic. He also related the clinical history of a fatal case of toxæmic jaundice, and showed microscopic specimens illustrating the pathology of the case. The patient had suffered from persistent diarrhœa, and in his large intestine there were found numerous small ulcers. There was no apparent obstruction of the large bile ducts, but, on microscopic examination of the liver, there were seen in the capillary bile ducts numerous plugs of viscid bile. There was some deposition of blood pigment in the spleen. The combination of these lesions was considered important, as bearing on the pathology of many cases of so-called non-obstructive jaundice.

OBITUARY.

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ERNEST HART, D.C.L.

BY the death of Ernest Hart, a gap which it will be difficult to fill has been made in the ranks of medical journalism and politics. For a number of years he has been a sufferer from glycosuria, but his courage and endurance prevented this being known, save to a closer circle of friends. But few of those whom he passed day by day realised that the never-resting editor, the undaunted Chairman of the Parliamentary Bills Committee, and the untiring advocate of sanitary reform, was affected by a fell disease, from which there was only one escape.

For the last two or three years Mr. Hart had been evidently failing, and on June 1897 the first evidence of diabetic gangrene manifested itself; in spite of skilled treatment, it advanced so much that in September it became necessary to have the right leg amputated below the knee. Thereafter his condition remained somewhat feeble, although both he and his friends were able to report improvement up till Christmas day, when he dined with a small number of his relatives and friends. In the early days of the New Year, however, it was manifest that he was going down-hill quickly. On Thursday, 6th January, he grew suddenly worse, and, after some hours of broken slumber, he passed away at six o'clock on the morning of the 7th.

Ernest Hart was born in 1835 at London, his father being in practice as a dentist in the West End. At the City of London School he distinguished himself greatly, and thereafter as a student of medicine at St. George's Hospital. He was admitted a Member of the Royal College of Surgeons of England in 1856, and five years later became Ophthalmic Surgeon and Lecturer on Ophthalmology to St. Mary's Hospital.

His attachment to journalism began early. At 23 years of age he was on the staff of the *Lancet*. Some eight years later he was appointed editor of the *British Medical Journal*, which, thanks to his indomitable energy and patience, quickly acquired a high position as a scientific and literary organ. As editor he brought the Journal from a position of comparative insignificance to one of wide influence. He took the deepest interest in every aspect of the affairs of the British Medical Association, and no expenditure of time or trouble was too great in the interests of that body. It is no exagggeration to say that no one member of the Association has approached him in the number and value of his services.

As Chairman of the Parliamentary Bills Committee, to which he was appointed in 1872, and over which he presided to within a short time of his death, he tackled every legislative measure and public question with a statesmanlike grasp. His influence among the foremost politicians and legislators of the past quarter of a century has been a large one, and was exerted unstintingly in the interests of the Association he loved so well.

Early in his career the disabilities of the Naval Medical Service occupied his attention, with the result that most important concessions were obtained for the Service; and till the end of his life his keenest interest and energy were directed similarly to the grievances of the Army Medical Service.

He was a most accomplished student and zealous exponent of all questions involving sanitary reform. Both as a witness before select committees, and by numberless articles in the Journal, and communications to medical congresses, he did much to hasten needful legislation. We need only cite his relation to the "Infant Life Protection Act," "The Public Health Act, 1875," and his reports and contributions on cholera, typhoid fever, scarlet fever, and other zymotic diseases, workhouse hospitals, barrack schools, smoke contamination, and vaccination.

Mr. Hart travelled much,—indeed, some of his critics thought he travelled too much,—but he always travelled with his eyes open, and brought home a harvest of facts and observations for the illustration or elucidation of some important subject.

His mind was of large range. He was a man of keen convictions, warm sympathies, undaunted courage, and unresting energy, all of which he devoted ungrudgingly, both in the vigour of health and through the darkening days of illness, to the service of the profession and the Association. Those who know the value of his work best will concede that he leaves the world cleaner, brighter, and better by his life.

ANALYTICAL REPORTS.

Melegar, a Vinegar made from Honey.

We have received samples of a vinegar made from pure honey, from the Melegar Works, Darenth, Dartford. The agreeable flavour of honey, along with its large proportion of sugar, suggested to the original designer of the product, that vinegar made from it would probably possess more fragrant and pleasant properties than appertain to the usual vinegars of commerce. We are quite justified in saying that the expectations of the maker are for the most part fulfilled. Containing about 92 per cent. of water and 1·12 per cent. of alcohol, Melegar gives on analysis, 5·37 per cent. of acetic acid, a very close approximation to the pharmacopœial standard of 5·41 per cent. No injurious ingredients are present. Melegar has a mild, agreeable taste, and constitutes a wholesome form of vinegar, adapted for culinary requirements or table use.

MEDICAL NEWS.

New Year Honours.

The announcement that Her Majesty had been graciously pleased to offer titled distinctions to some of the distinguished members of the medical profession in Scotland has been received on all hands with much gratification. The honours which have been conferred upon Sir William Gairdner, K.C.B., Sir John Batty Tuke, and Sir John Struthers, are not merely the recognition of high public service in distinguished official positions, but are an acknowledgment of lifelong devotion to the advancement of medical science.

MONTHLY NOTES
ON METEOROLOGY AND VITAL STATISTICS.

By A. LOCKHART GILLESPIE, M.D., F.R.S.E., F.R.C.P.Ed.,

MEMBER SCOTTISH METEOROLOGICAL SOCIETY.

METEOROLOGICAL MEANS FOR THE EAST OF SCOTLAND DISTRICT, FOR THE FIVE WEEKS ENDING JANUARY 1, AND FOR THE YEAR FROM JANUARY 3, 1897.

	Temperature.			Rainfall in Inches.		Sunshine. Hours.		Mean Daily Variability of Temperature.
	Mean.	Accumulated Day-Degrees. Above 42°.	Accumulated Day-Degrees. Below 42°.	Actual.	Accumulated from Jan. 3.	Actual.	Accumulated from Jan. 3.	
Mean	36°·9	*[1] 43° [2] 2372°	175° 853°	2·9	31·7	30·1	1277·0	3°·3
Observed	38°·2	[1] 39° [2] 2415°	194° 919°	4·24	29·9	37·0	1353·0	3°·6
Difference	+1°·3	[1] − 4° [2] +43°	+19° +66°	+1·34	−1·8	+6·9	+76·0	+0°·3

VITAL STATISTICS.

MORTALITY IN FOUR LARGE TOWNS IN THE EAST OF SCOTLAND, DURING DECEMBER, AND SINCE JANUARY 1. Actual Numbers and Rate per 10,000 per annum.

	Total.		Constitutional Diseases.		Circulatory System.		Nervous System.		Respiratory System.	
	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.
Deaths expected and Mean Rate for 1891–1895	[1] 1,337 [2] 13,358	240·0 199·8	207 2482	37·1 37·2	110 1219	19·9 18·2	130 1514	23·6 22·6	346 2735	61·3 40·8
Actual Deaths and Rate per 10,000	[1] 1,128 [2] 13,600	202·4 203·3	203 2654	36·4 39·6	131 1281	23·5 19·1	136 1507	24·4 22·5	248 2598	44·5 38·8
Difference from Mean	[1] −209 [2] +242	−37·6 + 3·5	− 4 +172	−0·7 +2·4	+21 +62	+3·6 +0·9	+6 −7	+1·0 −0·1	−98 −137	−16·8 − 2·0

	Digestive System.		Urinary System.		Pneumonia.		Phthisis.		Cancer.	
	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.
Deaths expected and Mean Rate for 1891–1895	[1] 78 [2] 872	14·0 13·0	29 343	5·2 5·1	109 972	19·7 14·5	106 1243	19·0 18·7	45 554	8·1 8·2
Actual Deaths and Rate per 10,000	[1] 84 [2] 956	15·0 14·2	26 361	4·6 5·4	109 1109	19·7 16·5	95 1346	17·0 20·0	52 615	9·3 9·1
Difference from Mean	[1] + 6 [2] +84	+1·0 +1·2	− 3 +18	−0·6 +0·3	± 0 +137	± 0 +2·0	−11 +103	−2·0 +1·4	+7 +60	+1·2 +0·9

* NOTE.—The figures [1] denotes the data for December, [2] for 1897.

The mean temperature of December was 1°·3 higher than usual. During the five weeks ending 1st January, the third and fifth were much warmer than usual, the fourth had a mean temperature 5° below the mean. The amount of rain which fell was above the average, as was the number of hours of bright sunshine. Southerly winds were more prevalent than usual, and the mean barometric reading was very low. Although the mean temperature was above the mean, the accumulated day-degrees over 42° were slightly lower, those below 42° considerably above the average.

For the year, the day-degrees over 42° work out at 43° above the mean, and those below 42° at 66°, also above it. The rainfall is deficient by nearly 2 in.; the hours of bright sunshine, seventy-six above the average.

The number of deaths in the four towns during December was below the average, this being especially marked in the case of respiratory diseases and phthisis. The chief cause, however, of the low death-rate is to be ascribed to absence of severe zymotic epidemics. The diminution in the deaths from diseases of the respiratory organs, excluding phthisis, amounted to ninety-eight out of an expected 346, or over 28 per cent.

The figures for the whole year show an excess of 242 deaths, or 3·5 per 10,000. The deaths from constitutional, circulatory, and digestive diseases were much more numerous than usual; those from cardiac and urinary diseases somewhat more numerous; while pneumonia claimed 137 victims in excess of the average, phthisis 103, cancer 60. Diseases of the respiratory system, including pneumonia, were much less fatal than usual, and of the nervous system slightly less so. The excess of deaths from pneumonia is 14 per cent. of the number expected, the deficiency under respiratory cases 5 per cent., or, if deaths from pneumonia be deducted, 15 per cent. below the average.

The greatest increase in the number of deaths over the average occurred in April, gradually lessening, until in November and December many fewer deaths than usual occurred. These variations corresponded closely with the temperature changes, and also with the variability of temperature.

December, therefore, was a warm month, with a heavier rainfall than usual, a prevalence of southerly winds, and with little frost and snow; while during the month the deaths were less numerous than usual, especially those from respiratory diseases.

The whole year, rather warmer, drier, and sunnier than usual, but with much broken weather, was characterised by an increased death-rate from nearly all causes discussed, save respiratory diseases.

EDINBURGH
MEDICAL JOURNAL.

ORIGINAL COMMUNICATIONS.

ON THE RELATION OF THE NERVOUS SYSTEM TO DISEASE AND DISORDER OF THE VISCERA:

The Anatomy and Physiology of the Nervous Mechanism of the Viscera.[1]

By ALEXANDER MORISON, M.D. (Edin.), F.R.C.P.Ed.

(*Continued from page* 136.)

(PLATES VII.–X.)

WHEN we strike the main stream of innervation at the apex of the visceral delta of secretory, mobile, and excretory nerve distribution, our task in tracing the current is considerably simplified. Here also, however, the threefold state referred to in the conditions of the ultimate distribution, is taken by the triple conditions and their associated questions, of medullated and non-medullated fibres, and of the ganglion cells, regarded as anatomical entities and conglomerate structures.

The vast majority of the fibres constituting the nerve bundles in the branches near their ultimate distribution, are non-medullated fibres—the fibres of Remak, a term which Kölliker applies to certain fibres only, of those originally described by Remak as belonging to the sympathetic system.[2] These fibres have been shown by the higher powers of the microscope to consist of many smaller fibrils. They may be distinguished from connective tissue, according to Kölliker, by their becoming opaque, not transparent on boiling, and on the application of weak solutions of acetic acid.

In addition to these non-medullated fibres, a much smaller number of *medullated* fibres may be observed in the peripheral visceral nerves, especially in transverse sections of those treated with osmic acid. As I have already stated, Kölliker regards medullated fibres occurring in the distant visceral periphery as sensory. Both kinds, according to him, have free endings.

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[1] The Morison Lectures, delivered before the Royal College of Physicians, Edinburgh.

[2] *Op. cit.*, Bd. ii. Hälfte 1, S. 30.

The relation of these fibres to *ganglion cells* and clusters of cells is of anatomical and physiological interest. While the general relation of the peripheral ganglion cell, as an anatomical entity, to nerve fibres may be well shown by Sihler's method, their more intimate relation to these, and to one another when occurring in groups, is probably best shown in successful Golgi preparations. Dogiel, however, has obtained very good results by his modification of Ehrlich's methylene blue method. To these I shall have to make a passing reference later.

Secretion being a peripheral process, maintained ultimately, like every other function of the body, by force passing centrifugally from the dominant centres, the nerves of secretion must be regarded as belonging to the efferent or motor rather than to the afferent or sensory group.

Sensation, on the other hand, being a central phenomenon, the current in nerves evincing sensibility must be, as we know it is, centripetal. Now, as the nerve fibres originating in peripheral ganglion cells have a centrifugal course and distribution, it follows that the ganglion cell itself must have a centrifugal function. It does *not*, however, follow from this, as seems to be too readily assumed, that the cell is a mere link in a chain of passive conduction.

The ganglion cell may occur isolated on a nerve or small strand of nerve tissue (Plate VII., Fig. 8), or embedded as it were in the heart of a considerable trunk (Plate VII., Fig. 9). A group of cells may also form a fusiform or irregular enlargement on the course of a nerve larger than the nerve itself, one end (the afferent end) being as it were lost in the fusiform enlargement, and a fresh trunk issuing from the other or efferent end ; afferent and efferent in this sense being used relatively to the fusiform ganglion, not to the central nervous system from which both, naturally, are efferent (Plate VII., Fig. 10, and Plate VIII., Figs. 11 and 12). Or, again, a cell or group of cells may lie outside a nerve-trunk and have connections with *it* on the one hand, while on the other it distributes fibres in different but always centrifugal directions (Plate IX., Figs. 13 and 14). The ganglion cell may also apparently occupy a somewhat peculiar position in this wise. The cell or cells may be placed at a considerable distance from the nerve-trunk, and send axis-cylinder processes into the latter, the ultimate destination of which it may not be possible to trace (Plate IX., Fig. 15).

Finally, the cells may form a congeries which appear to be placed at the junction of a peripheral centrifugal system (Plate VIII., Fig. 8, *a*). These various relations of the peripheral ganglionic cell may be very distinctly seen in the illustration.

The relation of ganglion cells to one another is a matter of interest, but cannot at present be regarded as certainly determined.

Kölliker inclines to the prevailing belief, that the fine plexuses which surround the cells of peripheral ganglion cells are derived from cerebro-spinal motor fibres of the first class (that is, primary cerebro-spinal motor fibres), and not in any instance, as Dogiel insists, from fibres arising from peripheral ganglion cells.[1]

The question is very difficult to decide on anatomical grounds, for the intertwining of the axis cylinder of one cell with the processes of another in the same group, easily induces the belief that the two have active touch of one another. This apparent connection is shown in a Golgi preparation, given to me by Professor Kölliker's curator, and which is reproduced in Plate IX., Fig. 16. Physiological arguments, on the other hand, intended to solve this question, involve the production of so-called facts, which not only require the apprehension but also the comprehension of the recorder, that is, they require not only to be seen, but to be interpreted. The interpretation of all phenomena, and especially of experimental or artificial phenomena, is admittedly no easy task. Inasmuch, however, as the function of all efferent ganglia in a given stretch of peripheral nerve tissue is probably the same in kind, there does not appear to be any insuperable reason why a chain of relay structures should not be in touch with one another, as Dogiel considers them to be. We do not, therefore, appear to be at present in a position to express more than a "pious opinion" upon the subject, and do well to avoid too positive a dogmatism.

The opinion of the individual, as a result of personal observation and reflection, may, however, be modestly expressed. The evidence adduced so far—anatomical, physiological, and, last but not least, clinical—inclines me to the belief that successive ganglia and their cells may be connected anatomically, and support one another in the execution of a common function, while they are at the same time incapable of executing independent reflex actions. Against the latter there is at present a general consensus of educated opinion.

Had the spiral fibre, noticed by Beale, in ganglia from various situations in the frog,[2] really arisen, as he thought, from the surface of the cell, while the straight companion fibre arose from its interior, it would have been still less conceivable than it is now, that the one was afferent and sensory, and the other efferent and motor, for a double function in a single cell cannot at present be regarded as possible. This cell has very frequently been reproduced. I have recently had an opportunity, through the kindness of Dr. Beale, of examining the original preparation from which the well-known drawing was made, and of which the latter is an accurate portrayal. The specimen has been preserved for thirty-five years in acidulated glycerin, and is still perfect. From the general arborisation of efferent fibres, on cells of the sympathetic system, a cellular reflex would seem more probable did the spiral fibre, so accurately described by Beale as being on the surface of the cell, really end there. This Arnold and Ehrlich, quoted by Kölliker, maintain it does,[1] and that it is probably of cerebro-spinal origin. The cerebro-spinal nature of the spiral fibre cannot, however, at present be accepted without question.

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[1] *Op. cit.*, S. 868 and 869.

[2] *Phil. Trans.*, London, 1863.

Could we regard the spiral fibre as a *sensory* arborisation, and the straight fibre as the motor exit of a cell in a continuous motor chain, a cellular reflex would no doubt be more conceivable under these circumstances than when Beale supposed the spiral fibre to have its origin in the cell. The fact, however, that motor as well as possible sensory fibres in the central nervous system arborise on and communicate their own impulse to other cells, casts a doubt upon the functional nature of the spiral or arborising fibre in peripheral ganglia. Physiological evidence has therefore to be sought to corroborate or refute a notion suggested by anatomical possibilities. Such evidence is at present against the existence of peripheral reflex action.

While Dogiel thus appears to stand alone, among working histologists of repute, in maintaining an arborisation of the axis cylinders of one sympathetic cell upon another of the same group, and from this fact, and his maintenance of the existence of end-nets and loops in the ultimate distribution of nerves, represents a view at one time generally if not universally accepted, there appears to be a more general consent that the dendrites of ganglionic cells in the sympathetic system touch and embrace other cells of the same series. Gustaf Retzius figures such,[2] and quotes Kölliker and Ramon y Cajal as having demonstrated this fact.

What is the conclusion to which the last fact points? That these cells mutually nourish one another? Or is it that the cerebro-spinal nerve arborising on one cell, can through dendrites of neighbouring cells influence still others?

That dendrites, although they do not terminate in nerve fibres, may be conductors of nerve impulse, is admitted by Kölliker[3] and others, and in view of this fact, if fact it be, it is legitimate to conclude that one cerebro-spinal nerve may influence a number of peripheral ganglion cells, and through them a considerable territory of the organ to which they are distributed. This appears to be the view at present most generally accepted. Modern methods of staining, which have revealed the general multipolarity of peripheral ganglionic cells, render such a conclusion very reasonable (Plate X., Fig. 17).

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[1] *Op. cit.*, S. 42.

[2] *Biol. Untersuch.*, Stockholm, pt. iv. S. 58.

[3] *Op. cit.*, Bd. ii. Hälfte 1, S. 39.

Before leaving the subject of peripheral ganglia, I wish to draw attention to a cell system of practical interest in connection with the heart.

It is possible in certain situations to distinguish between what appear to be small penultimate, if not ultimate, clusters of *sympathetic* ganglionic cells, and the ganglia which occur in or near the efferent stream of the pneumogastric nerve.

The cells and groups of cells I refer to, have been met with by me in connection with the heart, and appear to be the same as those described by Vignal, who is quoted by J. Dogiel.[1] Groups of cells, from two or three to many more, may be met with in the fatty tissue at the base of the heart, and traced in transverse sections into the subepicardium over the chambers. Occasionally they may be observed under the superficial strata of the cardiac muscle. They stain well by the Nissl method, and reveal the same configuration and characters as the ganglionic cells of the lateral and collateral sympathetic chains. They may also lie in proximity to subepicardial vessels and the larger nerves, but do not appear to be in direct connection with either. The appearances now described may be very distinctly seen in the illustrations (Plate X., Figs. 18 and 19; Plates VII. and VIII., Figs. 10, 11, and 12). They may be easily distinguished, as I have said, from the ganglia on nerve trunks which I have already described, and of which I show good specimens for comparison with them, from the heart of a mouse, stained by Sihler's method. To the importance of this distinction, with reference to cardiac action, I shall have occasion to refer again.

In following the nerve stream still farther upwards, and passing by other more or less peripheral trunks, cells, and clusters, we reach the more central collections of nerve elements—the so-called collateral and lateral chains. The relation of these, on the one hand, to the periphery, and, on the other, to the cerebrospinal centre, is a matter of practical moment and scientific interest.

I have no desire to crush all observation into a Procrustean bed of what might be called triplicity, but, curiously enough, at this point also we have to deal in the main with a threefold state, namely, with nerve fibres which find their bourne in the ganglia, with those which arise in them, and with those which pass through or over them. I am, however, in good company in adopting this rule of three in classifying some points in sympathetic innervation. W. H. Gaskell of Cambridge, who wrote the first enlightening paper of practical interest on visceral control,[2] uses the threefold classification of nerves of vascular muscles, nerves of visceral muscles, and glandular nerves, and proceeds, moreover, to deduce the visceral nerves from three sources—the sacral, thoracic, and cervico-cranial—and to expose their behaviour or distribution from these points.

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[1] *Loc. cit.*, S. 226.

[2] *Journ. Physiol.*, Cambridge and London, vol. vii.

As regards nerve fibres which find their bourne in the lateral, collateral, or more distant ganglia, these reach the primary ganglia by way of the white rami communicantes between the cerebro-spinal and sympathetic systems. The white ramus communicans, as we know, consists of the joint contribution of the anterior and posterior spinal roots. Gaskell has shown[1] that in transverse sections of the anterior-spinal root, osmic acid reveals large and small medullated fibres, and in certain regions a much larger number of small fibres are to be observed than in others. The chief of these lies between the second thoracic and the second lumbar nerves inclusively. Gaskell further demonstrated that transverse sections of the white ramus presented almost although not quite exclusively the medullated fibres of small calibre, and only a few of larger size. Finally, he also showed that osmic acid detected, in the grey ramus, a few medullated fibres of large size, and still fewer of small size, and that the mass of the grey ramus consisted of non-medullated material. I have copied some of Gaskell's drawings to illustrate these points.

It can, however, be easily understood how impossible it is to follow by continuous ocular observation with the microscope the course and destination of fibres through so tangled a web as a sympathetic ganglion. It is at this point that the valuable researches of Langley come to our aid.

Langley found that about 10 mgrms. of nicotine injected into a vein of a cat prevented for a time any passage of nerve impulses through a sympathetic or homologous cell. He found also that the duration of paralysis increased with the dose. He argues, therefore, thus: "Since nicotine does not prevent an impulse started peripherally of a nerve cell from producing its normal effect, it follows that by stimulating a nerve at various points of its course the place or places where it is connected with nerve cells can be determined."[2] By the nicotine method the course of pilomotor nerves was determined by Langley, and also that of some nerves of secretion.

If, thus, a nerve in its course be only interrupted from conveying an impulse at certain cellular points upon it, it is evident that, at such points, some change in the anatomical and physiological continuity and character of the nerve must take place; the nerve, in short, may be assumed to arborise upon and terminate at the interrupting cell. Hence Langley's nomenclature of "preganglionic fibre" as applied to this portion of nerve, a term in place of which Kölliker suggests that of *pre-cellular*. The latter seems the more correct, inasmuch as the ganglionic cell as an anatomical entity, not the ganglion as a conglomerate structure, is the essential point of interruption.

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[1] *Loc. cit.*

[2] *Journ. Physiol.*, Cambridge and London, 1893, vol. xv. p. 181.

As, again, on the distal side of the interrupted point, the possibility of stimulation reasserts itself, it is evident that a 'postganglionic" or "postcellular" fibre, springing from the paralysed cell, takes up the rôle of conductivity. Thus a motor fibre may be shown to terminate in a given ganglion, or to pass through it to end in another.

The mode of determining the course of sensory fibres in "dumb animals," rendered still more speechless by anæsthetics, must be on other lines. It is by the abolition of reflex action that the course of sensory fibres can be determined. The present position of the majority of anatomists, physiologists, and physicians is, that the sensory nerve fibres pass from the periphery, without arborising interruption, through intervening ganglia, and reach the spinal cord unbroken. This is the view taken by Kölliker. The sensory nerve is not even allowed by him the poor consolation of an occasional collateral, but is marched severely from the periphery to the centre, by way of the grey ramus communicans, without being permitted to look to the right or to the left. Whether it does so or not, nevertheless, in an unauthorised manner, like the course of Galileo's earth round the sun, remains still somewhat uncertain. It must be admitted, however, that such evidence as exists at present is in favour of the opinion of the hour, namely, that the sensory current goes straight to the centre without intermediate dispersion, and dealing, as we are in this case, with a central phenomenon, *sensation*, this seems *a priori* probable.

While peripheral sensory fibres are considered by Kölliker to reach the spinal cord by way of the grey ramus, this connection of the sympathetic ganglia contains also motor, *i.e.* efferent, fibres of ganglionic origin. These, although coursing towards the spinal cord, are none the less peripheral, when regard is had to their origin in an extraspinal ganglion. For having elucidated this point we are indebted to Gaskell.[1] His words are: "Putting together all the facts mentioned, the conclusion is evident that the grey rami communicantes spring from ganglia of the lateral chain, and pass peripherally to supply the corresponding spinal nerves, together with the vertebræ and spinal membranes. They are, in fact, peripheral nerves of the same kind as many others which arise from the chain of lateral ganglia."[2] To illustrate these points diagrammatically, I may be allowed to refer to an instructive illustration of Kölliker's,[3] with which I find myself in agreement, except, and I say so with the profoundest deference, with that portion of it dealing with the final point in the journey of the sensory stream to the cord. This must also, it appears to me and chiefly, reach the cord by way of the contribution from the posterior root to the white ramus.

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[1] *Loc. cit.*, Reprint, p. 6.

[2] *Loc. cit.*

[3] *Op. cit.*, p. 862.

This point emphasises the importance of a knowledge of the embryology of the cerebro-spinal and sympathetic system in its bearing upon anatomical, physiological, and practical medicine.

Remak, whose sagacity time has vindicated in the matter of the local cellular origin of nerve fibres in ganglia, has more recently been supported in his views regarding an important point in the embryology of the sympathetic nervous system. Many modern embryologists, including F. M. Balfour,[1] have derived the sympathetic system from the epiblast, and Balfour describes the lateral ganglia as "at first simply swellings on the main branches of the spinal nerves." Remak believed the sympathetic chain arose separately in the mesoblast, and his position has been convincingly upheld by Professor A. M. Paterson in his well-known paper on the "Development of the Sympathetic Nervous System,"[2] in which, by a series of sections, which to all appearance can only be interpreted in one way he has demonstrated, that the lateral sympathetic chain arises as a series of isolated points, which ultimately become connected with the spinal nerves and with one another, and that the cervical and lumbar portions of the system must be regarded as outgrowths of the lateral chain.

In this connection, also, a point of especial interest to the visceral pathologist is the evolution of the medullary portion of the suprarenal bodies from the sympathetic chain. Paterson sums up his position in the following words:—"From these considerations it may be regarded as very possible that, under the term 'sympathetic nervous system' are included two structures entirely independent in nature, origin, and function—the sympathetic system and the nervous system proper. Such a view would be entirely in harmony with the mode of development described above, and would render more intelligible than has hitherto been possible, certain developmental peculiarities, such as a conversion of a part of the sympathetic system into suprarenal bodies."[3]

I have copied some of Paterson's illustrations to show these points.

These embryological conclusions, moreover, support Gaskell's general description of the origin of the visceral nerves,[4] which is in these words: "They issue from the central nervous system in definite sacral, thoracic, and cervico-cranial regions.

"From these regions they pass out into the ganglia of the visceral system.

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[1] "A Treatise on Comparative Embryology," 1881, p. 384.

[2] *Phil. Trans.*, *B*, London, 1890.

[3] *Loc. cit.*

[4] *Loc. cit.*, Reprint, p. 11.

"From the sacral region they pass out in a single stream to the ganglia of the collateral chain.

"From the thoracic region they pass out in a double stream, one to the ganglia of the lateral chain, and the other to the ganglia of the collateral chain.

"From the upper cervical region they pass out in a single stream to the ganglia of the main stems of the vagus and glossopharyngeal nerves."

We have now followed the stream of visceral innervation up to its central origin, and it only remains to emphasise a few points, so far as they are known, and they are still very imperfectly known, which have a bearing upon the interpretation of the clinical phenomena with which we shall be concerned in the second series of these lectures.

Even in the spinal relations of the visceral nerves we find we cannot rid ourselves of the incubus of a triple arrangement. Gaskell has pointed out the very remarkable coincidence in the range of the vesicular column of Clarke, and its two cognate centres in the sacral and cervical regions, with the outflow of nerves which we have learned to regard as visceral. He has also endeavoured to show, from a study of the spinal accessory nerve, that we may rationally regard the ramus visceralis as having its roots in the lateral horn, and in the column of Clarke. The spinal segment, according to him, thus consists of an anterior or somatic portion, a posterior portion, and a lateral, visceral, or splanchnic portion, which has its roots in the structures named.[1] As regards his views of the relation of the vesicular column to the visceral nerves, we shall learn that they are disputable.

It has been already shown that nerve fibres, arising in the ganglia and coursing centrally, are to be regarded as peripheral nerves. It is therefore only with the origin of the nerves which end in ganglia and with those that pass through them, namely, the sensory nerves, that we are concerned in discussing the central relations of the visceral nerves.

In Kölliker's diagram,[2] the sensory fibres of the viscera are made to return to the cord by way of the grey ramus communicans. But if the white ramus be an offshoot of the combined spinal nerve, as we know it is, it seems to be the more natural conclusion that most if not all sensory fibres must return by way of the contribution to the white ramus from the posterior or sensory spinal root. As Michael Foster[3] remarks on this point, even the revehent fibres, as he terms them, from the ganglia, which usually run in the grey ramus, seem to return at times in the white, for the very sufficient reason that the one is occasionally indistinguishable from the other. The grey ramus, moreover, cannot in any case be regarded as a true root of the splanchnic system, and Gaskell has shown how in the tortoise, and in the case of some nerves even in the dog, the whole visceral ramus issues from the ganglion on the posterior root of the spinal nerves.[1]

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[1] *Loc. cit.*

[2] *Op. cit.*

[3] *Op. cit.*, 6th edition, p. 174.

It is simpler, therefore, to conceive the stream of visceral sensibility to flow back to the cord by the channel by which it left it, and thus to amalgamate the mechanism of visceral sensations, which we shall study in a subsequent lecture, with sensory phenomena in general.

Although, therefore, Gaskell's surmise, that the posterior root of the viscero-motor outflow is in the cells of Clarke's column, or in homologous cells, does not rest on anatomical demonstration, it is generally admitted that a considerable portion of the sensory fibres of the posterior root arborise on these cells. Kölliker, who quotes Golgi, Ramon y Cajal, and von Lenhossék as agreeing with him,[2] states that he is unable to support Gaskell's surmise from observed facts. Sensory fibres, then, having arborised on cells of the vesicular column, at once from the latter strike the direct cerebellar tract, and thus reach the cerebellum, whence, by probable but not yet fully demonstrated paths, motor visceral impulses may be assumed to reach the small cells in the antero-lateral horn, from which the small-fibred medullated nerves arise which characterise the efferent stream of visceral innervation. Pain and other visceral sensations likewise prove that the ascending impulse reaches the cerebral cortex by the usual track for ascending sensibility. The anatomical considerations I have mentioned in fully developed and embryological states, explain the opinion—at one time entertained by leading anatomists and physiologists, such as Bidder and Volkmann, Kölliker, and others of the older school of scientists — that there was an inherent independence (*Selbstabhängigkeit*) in the sympathetic system. Even now, in a strictly limited sense, we appear to be justified in assuming a measure of executive or motor independence in the innervation of visceral control, of which I shall say more when considering some physiological aspects of the question. But the commonly observed influence of mind on body, the pain, as I have stated, at times associated with visceral lesions, and the influence of corporeal conditions on the sense of well-being, go to prove that the so-called independence of the sympathetic nervous system is more apparent than real.

A histological examination of the cerebello-nuclear tract especially, reveals considerable morphological likeness between the cells in these regions and those of the one time quite detached and always outlying and subordinate sympathetic system. Gustaf Retzius alludes to the likeness of cells of the sympathetic to ganglion cells in the anterior cornua of the cord, and Paterson also[3] rests some of his argument upon the distinctive histological features of the nerve elements in the sympathetic. To myself this morphological likeness was first suggested on examining cells in the grey matter of the inferior cerebellar peduncle, and observing their resemblance to those of the posterior root ganglion. But the dominant cell elements in the cerebellum and its related structures generally, such as the olivary bodies, resemble the cells of the sympathetic system so much more than do those distinctive of the higher centres in the cerebrum, that one cannot avoid the conjecture that with this morphological likeness there is also associated a functional relationship of a somewhat close order, which will be rendered clearer by future research.

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[1] *Loc. cit.*, Reprint, p. 62.

[2] *Op. cit.* Bd. ii. Hälfte 1, S. 125.

[3] *Loc. cit.*

The relations of the vago-glosso-pharyngeal and vagus accessory nerves.—To the vago-glosso-pharyngeal and its associated accessory nerve belong a mixed series of voluntary and involuntary actions. Physiological experiments ending in the definite and brilliant demonstrations of Horsley, Semon, and Risien Russell have localised the cerebral centres for the muscles of phonation. No definite result, however, has yet been reached as regards the cerebral representation of the involuntary actions carried out by the par vagum. That these have intimate relations with the higher centres cannot, however, be questioned. It is not, moreover, in any way remarkable that the more direct tracts of voluntary motion should have been discovered more easily than those of visceral action, for the relations of the involuntary system to volition are much the more complex, and involve a consideration of the mechanism of all-embracing mind. The emotions which "stir the heart," to use a conventional and subjective phrase, not without physiological significance, may or may not find expression in words. We can control the latter, and the mechanism of the phonic element in speech is a comparatively simple matter. But the unexpressed influence of the emotions may be existent, operative, and beyond the power of men to control, until, in the grimly pathetic language of the epitaph composed by himself, over the remains of the talented and unfortunate Dean of St. Patrick's, they reach that bourne,

> "Ubi sæva indignatio ulterius, cor lacerare nequit."

The central connections of such influences are as wide as their causes, and are not to be localised by so many punctures in the floor of the fourth ventricle, or revealed by an accommodating monkey, after removal of its calvarium.

The proximate centres of vago-visceral action, however, lie, as we know, in the medulla oblongata, and with these and their more evident connections we must in the meantime, as practical men, rest contented. The complex relations of the three assumed sources of the vago-glosso-pharyngeal and vagus accessory nerves have been a fruitful source of hypotheses; and the exercise of anatomical ingenuity, and hypotheses more or less ingenious, and observations more or less accurate, will still be offered and made, before the questions affecting this important subject are placed upon an incontrovertible basis.

An advance towards greater simplicity in our conceptions of the subject has, however, been made in the growing tendency to regard the ascending vago-glosso-pharyngeal root, or fasciculus solitarius of Lenhossek, as the true sensory root of those nerves, the nucleus ambiguous as the source of their motor fibres and representing the highest medullary portion of the nerve accessory to the vagus, and the so-called "sensory root" of the vago-glosso-pharyngeal nerve as a terminal rather than initial nucleus.

On the latter point Kölliker[1] remarks: "The so-called sensory nucleus of the vago-glosso-pharyngeus is, as we now know, no place of origin of the fibres of these nerves, but a terminal nucleus (*Endkern*) in which they end free, while from its cells other fibres arise which bring about connections with other parts of the brain." These connections are still largely undetermined. As regards the apportionment of this nucleus between the glosso-pharyngeal and vagus nerves, Kölliker,[2] like Alexander Bruce,[3] whom I have the honour of following in this lectureship, allots the upper part to the former and the lower to the latter. The fasciculus solitarius, or, in transverse section, *rotundus*, regarded as the sensory root of the vago-glosso-pharyngeal nerve, has been traced downwards for a distance beyond the decussation of the pyramids not yet determined. Roller, quoted by Kölliker, regards this fasciculus and its grey matter as the sensory root of the glosso-pharyngeus alone, but Kölliker, judging from the proportion in size between the fasciculus and that nerve, inclines to the belief that it is likewise the source of the sensory fibres of the vagus. In this view he is supported on embryological grounds by Kölliker.[4] The relative position of these centres to one another and to neighbouring structures may be seen in many specimens.

In concluding the anatomical portion of these lectures, I desire to express my indebtedness to Geheimrath Albert von Kölliker, my always revered teacher, and to the curator of his museum, Herr Hofmann, for the great privilege of examining the Golgi-Cajal preparations of the nervous system in the Anatomical Institute at Würzburg. Also to Dr. Risien Russell, for advice given to me in the pathological laboratory at the National Hospital for Paralysis and Epilepsy in London; and to Dr. Ludwig Freyberger, pathologist to the Great Northern Central Hospital, for willingly rendered assistance. To my valued friend, Mr. Frank Crosbie of London, I am much indebted for the trouble he took in producing the photomicrographs and slides for illustrating these lectures, a work in which he was ably assisted by my friend, Dr. F. W. Forbes Ross, also of London.

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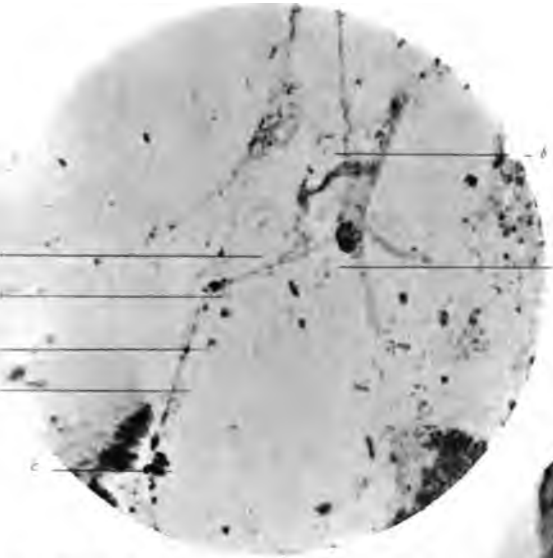
[1] *Op. cit.*, p. 259.

[2] *Op. cit.*, p. 240.

[3] "Illustrations of the Nerve-Tracts in the Mid and Hind Brain," p. 4.

[4] *Op. cit.*, p. 248.

(*To be continued.*)



. 8.—From the hepato-duodenal region of a
mouse. (*a*) Large cluster of ganglion cells;
(*b*,*b*,*b*,) Branches; (*c*,*c*,*c*,) Ganglion cells.

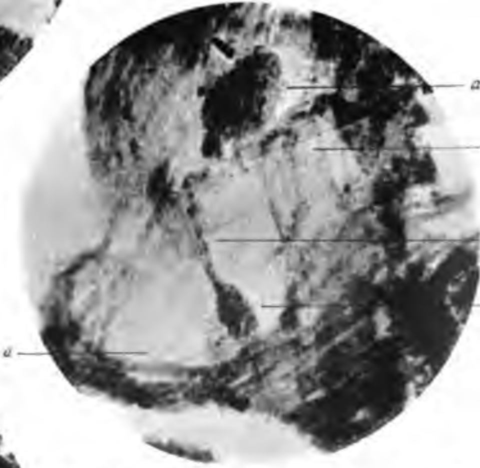
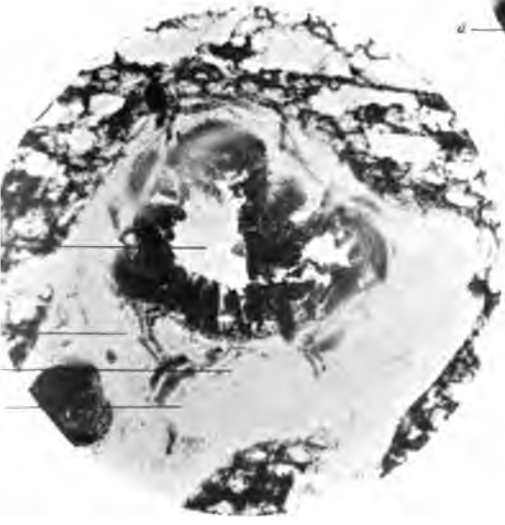


Fig. 10.—From the heart of a mouse. (*a*) Tr
of vagus; (*b*) Fusiform cluster or gangl
cells on (*a*); (*c*) Fibres issuing from (*b*) as
continued trunk of the vagus; (*d*) Fat ce
(*e*) Hair of mouse.



.—Innervation of a bronchus from the lung of a kitten.
) Nerve trunk with a cluster of ganglion cells; (*b*,*b*,)
ranches of (*a*); (*c*) Lumen of bronchus.

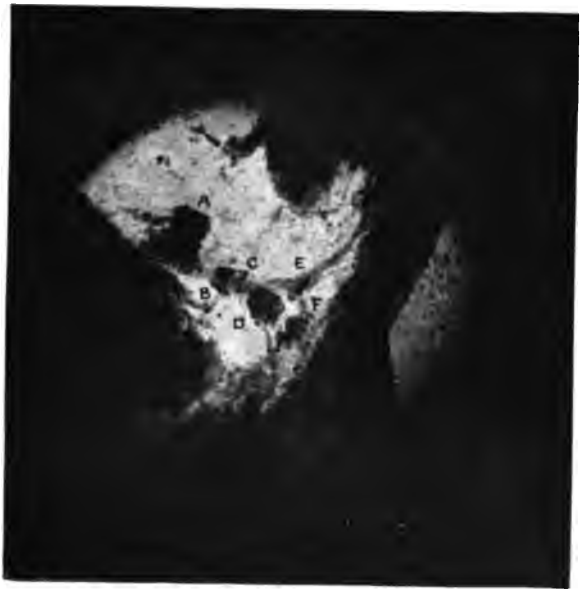


Fig. 11.—Large ganglia on the vagus (*A,B,C,D,E,F*), Swift's obj. $\frac{1}{3}$.

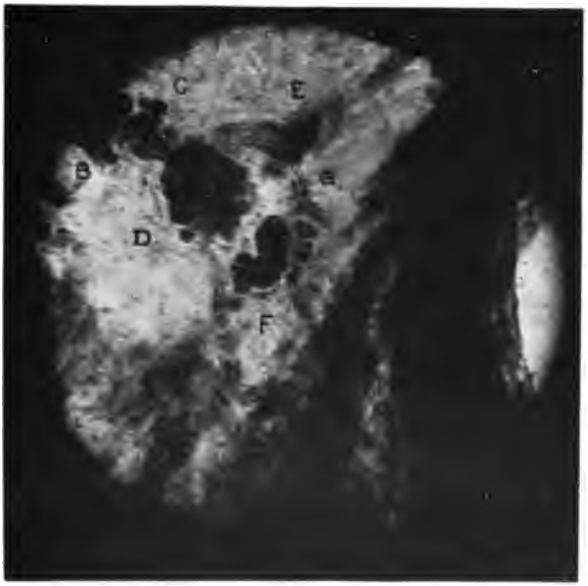
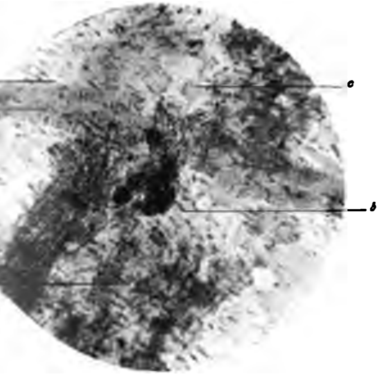


Fig. 12.—Portion of Fig. 11 enlarged (Swift's obj. $\frac{1}{6}$). (*G*) Branch going to the vagal ganglion (*F*) and coursing through it.



—From the kidney of a mouse. (*a*) Nerve nk ; (*b*) Ganglion cells ; (*c*) Nerve strand ceeding from cluster ; (*d*) ditto. From (*c*) ves arise which encircle the blood vessel but are not shown in the photograph.

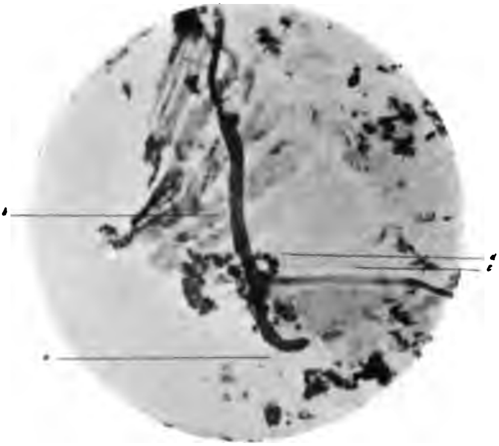
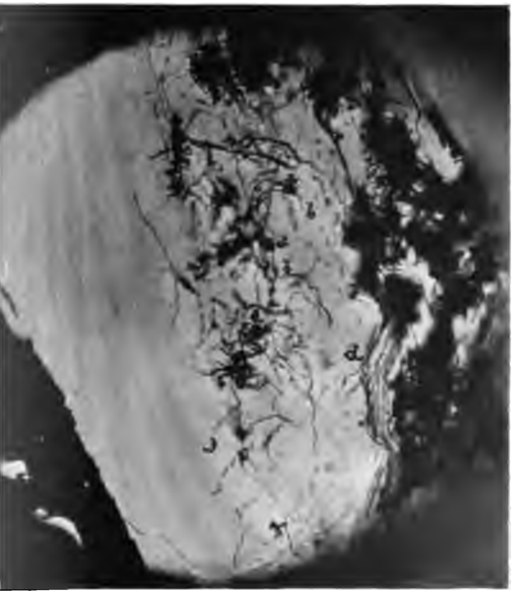


Fig. 14.—From the spleen of a mouse. (*a*) Nerve trunk ; (*b*) ditto ; (*c*) ditto ; (*d*) Crescent of ganglion cells.



.—Cervical sympathetic ganglion of a calf. (*a,a,a,*) urons ; (*b,b,*) Neuraxons ; (*c*) Neurodendrites ; (*d*) ricose nerve fibrils.

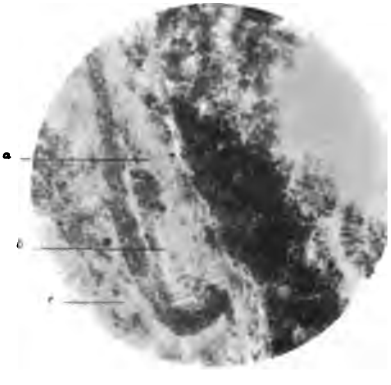
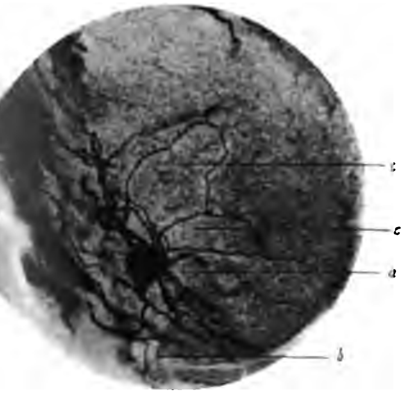


Fig. 15.—From the spleen of a mouse. (*a*) Ganglion cells ; (*b*) Strand connecting (*a*) with the nerve trunk (*c*).



17.—Würzburg Golgi preparation. Cell from the cervical sympathetic in a calf. (*a*) The neuron; (*b*) The neuraxon; (*c*,*c*.) Neurodendrites.

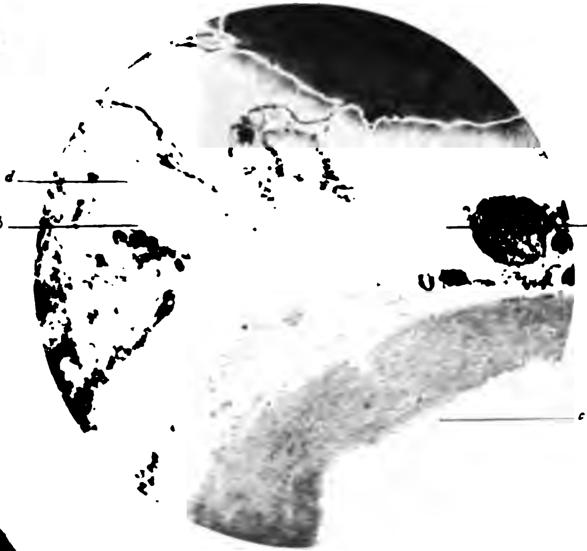
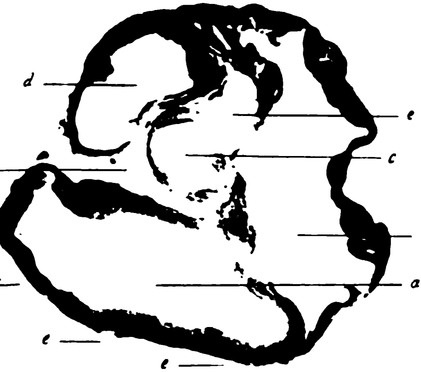


Fig. 18.—Transverse section of the base of the heart in a cat. (*a*) Vagus; (*b*) Sympathetic ganglion cells; (*c*) Wall of aorta; (*d*) Fat cells.



19.—Transverse section of the heart of a cat. (*a*) The cavity of the left, and (*b*) of the right auricle; (*c*) The lumen of the aorta, and (*d*) of the pulmonary artery; (*c*, *e*, *e*, *e*, *e*,) The situations in which the sympathetic ganglion cells described in the text were found.

ON THE SYSTEMATIC PHYSICAL EXAMINATION OF THE CHEST.

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(*Concluded from page* 145.)

II. EXAMINATION DIRECTED TO THE RESPIRATORY SYSTEM.—We have now arrived at a stage in the examination of the chest in which the two important systems, the respiratory and cardio-vascular, must receive separate attention and study; though it should never be forgotten that abnormal signs, associated with either of these systems, are not uncommonly of essential service in the diagnosis of morbid conditions affecting the other system. Moreover, it is by such signs that we mainly recognise diseases affecting other intrathoracic structures; while they are often produced or modified by abdominal conditions. As a rule, it is convenient to begin with the respiratory apparatus, unless there are obvious indications that the case is practically one of pronounced cardiac disease. I propose, therefore, now to discuss the further course of procedure to be followed in relation to this system.

1. *Respiratory movements.*—The intelligent and systematic clinical study of the movements of breathing is not only extremely important, but is in reality one of the most difficult parts in the examination in not a few cases. It often demands the most methodical investigation, as well as concentrated attention, before it can give any reliable results. Obviously, the ability to carry out such investigation in anything like a rational manner implies a previous knowledge of the physiology of the respiratory movements, comprehensively and in its various details, the diaphragmatic as well as the chest movements being duly taken into account. How far such knowledge is possessed by the average student I will not now stop to inquire. Further, the deviations from health are numerous and may be complicated, so that it is very desirable to have a tolerably clear conception beforehand of what they might be, both as a general guide in the investigation, and to enable the clinical observer to recognise the abnormal phenomena which may be met with in any particular instance. The movements should be first studied during quiet respiration, without conscious knowledge or help on the part of the patient; and then during deep or forced breathing, if circumstances permit. In order to perform this act properly, the individual has not uncommonly to be taught how to do it, and a personal demonstra-

tion by the investigator generally saves time and gives a better result than merely telling the patient to "take a deep breath."

Coming to the methods of investigating the respiratory movements, they present such scope for inventive ingenuity, and lend themselves so readily to graphic record, that it is not to be wondered at how strong an attraction instruments and apparatus of different kinds have both for the physiologist and the physician. Hence we have the thoracometer, the stethograph, and other more or less elaborate aids to investigation. Nevertheless, I maintain emphatically that, in this case, as in studying the chest at rest, the simple methods of inspection and palpation are in the ordinary routine of practice absolutely sufficient for the purpose; and anyone who neglects and ignores them, and relies upon the mere help of instruments, is committing a grave mistake, for he not only fails to avail himself of information literally ready to his "hand and eye," but is certain to overlook most serious deviations from health, which cannot possibly be demonstrated or recorded by any kind of apparatus. I feel very strongly upon this point, and, if space permitted, could easily give many striking illustrations of the statement just made. Of course, these remarks are intended for those in the medical profession who, in my opinion, are inclined to be too "scientific." As a matter of fact, the "busy practitioner" has neither time nor inclination to use any instrument for the purpose under consideration. At the same time, I wish strongly to impress upon both the student and the practitioner the great importance of "studying" efficiently the movements of respiration, as an essential part of the clinical investigation of the chest, and of recognising how easily the thing is done, if only a little trouble be taken in training and practice. Another point I desire to emphasise here is the special value of employing inspection and palpation together, when endeavouring to estimate and analyse the respiratory movements. It is worthy of remark that pronounced deviations from normal breathing, apart from its mere frequency, may not uncommonly be recognised even through more or less clothing, which is particularly worth remembering in acute cases; but, of course, observation under such conditions is not reliable, and as a rule adequate exposure of the chest, under a good light, is required, as well as of the upper part of the abdomen when diaphragmatic respiration has to be studied, which may be significant, not only in reference to thoracic affections and conditions of the diaphragm itself, but also to certain abdominal complaints. While not advocating or caring for the use of elaborate apparatus for investigating respiratory movements, unless under special circumstances, I must draw attention to the fact that, for recording purposes more particularly, simple measurements or the cyrtometer may again be employed with much advantage in appropriate cases.

The deviations from healthy breathing are so numerous in disease, that I refrain from making any further allusion to them on this occasion, as it would not be possible to say anything practical without discussing them at some length.

2. *Special tactile signs.*—Inspection can give no further information in physical examination of the chest, so far as the respiratory system is concerned. Palpation or digital examination, however, is most useful by itself, for the purpose of investigating an important class of signs of the nature of tactile sensations. They chiefly include the well-known varieties of *fremitus*, named respectively *vocal, tussive, rhonchal,* and *pleuritic friction fremitus.* Vocal fremitus often demands careful attention, and although it is generally recognised in a way, it certainly is not studied so frequently, systematically, or thoroughly, as it ought to be in individual cases, for it is capable of yielding most valuable information. Rhonchal and friction fremitus are also not so regularly looked for or made so much of as they might be. The former is not uncommonly felt at once, during ordinary breathing, when the hand is placed on the chest; but it may require deep respiration or a cough for its production. On the other hand, cough often gets rid of it. This sign is of particular value in children. Friction fremitus generally necessitates deep breathing for its development; and as it is in the large majority of cases a localised phenomenon, and not always very pronounced, more care is demanded in searching for it. It is not cleared away by the act of coughing.

Another tactile sensation not unworthy of attention is that yielded by the bony and cartilaginous framework of the thorax, when pressure is made with the fingers. This sensation may indicate, on the one hand, undue softness; or, on the other hand, excessive firmness and rigidity. In exceptional cases a feeling of fluctuation in one or more of the intercostal spaces is associated with an accumulation of fluid in the pleural cavity, especially an empyema pointing towards the surface; or with a pulmonary abscess or hydatid cyst. Still more rarely a fluctuation wave can be elicited. Here may also be noticed the rare but curious sensation felt over a limited area in connection with a hernial protrusion of a portion of lung.

3. *Percussion signs.*—We now come to a particular method of examination, the object of which is to elicit certain definite classes of signs, namely, *sounds* of various kinds, and *tactile sensations,* such as degree of resistance, elasticity, etc. The latter deserve more than a passing mention, if space permitted, as the tendency is to ignore them entirely, and yet they may be very instructive. It is not my business to teach here how to percuss, or whether it is better to do it with the fingers, which is my own practice, or with some special pleximeter and plessor. I must point out, however, that it is a method in which proficiency does not come by instinct, nor are the signs which it is supposed to study easily

mastered. To be of any service at all, the "art of percussion" has to be learnt by much practice; and it takes a long time to become at all familiar with the various phenomena which it reveals. Indeed, it is not at all uncommon to meet with a clinical investigator, at any rate in the stage of a "medical student," who can percuss remarkably well, but yet cannot appreciate the very signs he himself brings out by this method. While dealing with it at present in connection with the respiratory apparatus, it must be distinctly understood at the outset that percussion has a comprehensive relation to the chest, as regards its walls, its contents, and the abdominal conditions which may influence the signs to be studied by this method. Hence it is necessary to be well acquainted with the percussion signs which the thorax as a whole presents in health. Then the clinical investigator has to be prepared for any striking deviation from the normal which may come under his notice, but which may depend upon a great variety of conditions. For example, it is not unusual to come upon more or less pronounced dulness, which may be due to many causes altogether independent of the respiratory apparatus. Nevertheless, in relation to this system there are very definite points to be attended to when practising percussion. While not attempting any description of individual signs, the deviations from the normal which have to be recognised in relation to percussion sounds may be thus indicated:—

(*a*) Increase or diminution in the extent of the ordinary pulmonary resonance.

(*b*) Increased clearness of the sound.

(*c*) Hyper-resonance.

(*d*) Deficient resonance, varying in degree to the most absolute dulness, this being in certain conditions accompanied with more or less increased resistance, ending in extreme hardness or a "wooden" feel.

(*e*) Peculiar percussion sounds, the chief varieties being known as tympanitic, tubular, metallic, amphoric, and cracked-pot sound.

(*f*) Marked differences from the usual changes produced upon the percussion sound by forced inspiration and respiration.

(*g*) Variations in the sound elicited on superficial and deep percussion over a limited area.

4. *Auscultatory signs.*—Undoubtedly, and for obvious reasons, auscultation, as a method of examination, receives a very large share of attention in relation to the chest, and the signs it reveals are, as a rule, fairly well studied. I must refrain altogether from discussing how it should be carried out, except to remark that *direct* or *immediate* auscultation is not so much recognised or learnt practically as it ought to be; for in not a few instances, and under particular circumstances, it possesses decided advantages over auscultation with the aid of any kind of stethoscope, and this method should certainly not be entirely forgotten or ignored.

Of the modern apparatus intended to intensify sounds for auscultatory purposes I have no experience, and am not at all inclined to use them. They certainly might be very misleading.

The phenomena to be studied by auscultation, in connection with the respiratory apparatus, which practically come under the category of "sounds," are quite definite, though they are numerous, and present considerable variety. Before, therefore, this method can be practised in any rational way, it is again necessary to have a tolerably clear conception of the nature of these phenomena, and to become as familiar as possible with them in actual patients. In the methodical investigation of auscultatory signs, in relation to the respiratory system, it is well to make it a rule or habit to go through a regular course of procedure, namely, first to listen during quiet breathing; then during deep respiration; next, to make the patient speak, or repeat "ninety-nine," or "one, two, three," etc., and in suitable cases to whisper; and, lastly, to cough more or less vigorously, which act in many cases brings out most important signs, and it should never be forgotten. In dealing with infants and young children, who cannot be thus directed, the act of crying generally brings out all that is necessary for auscultatory purposes, and may often be encouraged with advantage, rather than checked. Of course it is not safe to neglect any part of the chest when practising auscultation, but an experienced clinical observer can run it over very rapidly, and then devote his attention more particularly to any region requiring more thorough examination. Moreover, it is by no means always necessary actually to expose the surface, especially when performing direct auscultation.

To attempt anything like a comprehensive classification of auscultatory signs, in connection with the respiratory system, is obviously much more difficult than in the case of percussion signs; and on the present occasion it must suffice to point out, for general guidance, that they come under the following categories:—

(*a*) Changes affecting the normal respiratory or breath sounds.

(*b*) Adventitious sounds originating in the air tubes or lungs, comprehensively known as "râles" and "rhonchi," but presenting several well-recognised varieties, some having peculiar and characteristic qualities.

(*c*) Pleuritic friction sounds, also varying in their characters.

(*d*) Changes affecting the vocal and cry resonance; as well as certain peculiarities of the whispered utterance.

(*e*) Changes in the tussive or cough resonance, which are practically similar to those affecting the voice, and may be studied instead, if necessary; and also certain special signs brought out by the act of coughing. This act, further, often modifies other signs.

For the sake of those who may not have had much experience, I venture as a warning to draw attention to the well-known fact that quasi-adventitious sounds may be brought out during deep respiration, originating in the superficial structures, some of the conditions producing them having already been alluded to; or in the mediastinal tissues. Moreover, sounds associated with certain morbid states of the lungs, sometimes very peculiar, may now and then be brought out by the movements of the heart, or by the act of swallowing, but there ought to be no difficulty in recognising their significance.

III. EXAMINATION OF THE CARDIO-VASCULAR SYSTEM.—Although, when taking a comprehensive view of the chest, one cannot avoid noting, in not a few instances, abnormal physical signs associated with the cardio-vascular system, which may be very suggestive or even characteristic, yet it is far more satisfactory, in my opinion, to deal with this system independently, and on a definite plan, of which I now proceed to give an outline. Whether this is done before or after the investigation of the respiratory apparatus, must be determined, as I have already intimated, by the nature of the case. I use the expression "cardio-vascular system" advisedly and with a purpose. Under ordinary circumstances the chief attention would naturally be paid to the heart and its surrounding pericardium, though the latter is often absolutely forgotten, especially in chronic cases; but the clinical investigator ought to make it an invariable rule not to ignore or overlook, at any rate, the great vessels of the chest and neck, which are not only frequently the seat of morbid changes in themselves, it may be of a grave nature, but in many instances present signs of the greatest value in relation to the diagnosis of cardiac diseases and other conditions. I am not now referring to aneurysm, which, for the present, may be put out of consideration, as it belongs to a particular group of cases which require special investigation. My observation compels me to say that in the ordinary routine of practice the state of the aorta and its main branches, not forgetting the coronary arteries of the heart, never enters into the calculation of the clinical observer, and even pronounced and extensive atheroma or calcification is not uncommonly entirely overlooked. Only on this assumption, moreover, can be explained the extraordinary application of certain modern methods of treatment to not a few heart cases, of which I have met with some glaring examples, where the state of the vessels has absolutely contra-indicated their employment, and the results have naturally been disappointing or sometimes disastrous.

The course of procedure, and the points to be attended to in carrying out physical examination of the præcordium and its vicinity, in relation to the cardio-vascular system, may be briefly summed up as follows:—

1. *Local change in conformation.*—It is well, when proceeding to examine the heart, to pay definite attention to this point at the outset, in order to determine whether there is any fulness or

bulging over the præcordial region and its neighbourhood, or, on the other hand, depression of the thoracic wall, which may be associated with, and important signs of, certain morbid conditions of the organ itself, or of the pericardium, especially in young subjects. Inspection and palpation, as a rule, reveal all that it is necessary to note, but local measurements or other methods may sometimes be required to give greater precision.

2. *Cardiac movements.*—There is no class of phenomena that demand more systematic, careful, and intelligent study in the clinical investigation of the heart than those associated with its movements or action. In a large proportion of cases they yield information of a most useful and practical kind, and which, it may be, cannot be obtained in any other way. And yet this part of the examination is frequently conducted so imperfectly and casually that it affords little or no real help in diagnosis. It is by no means sufficient merely to localise the situation of the apex beat; and it may be remarked in passing, that it is a great mistake to regard "apex beat" and "impulse" as synonymous terms, which is often done. The impulse in many instances extends far beyond the apex beat, and there are several points in relation to it which require thoughtful attention. Indeed, there may be more than one impulse over the cardiac area, each demanding due investigation. I think, therefore, it is well, without paying too much regard to particular terms, to emphasise the fact that we have to study the *movements* of the heart as a whole, which sometimes are decidedly complicated; and thus to recognise and try to estimate the meaning of any abnormal signs directly connected therewith.

With regard to the methods to be employed for the purpose now under discussion, I must again insist upon the essential value of inspection and palpation, used both separately and in combination. The one method often corroborates the other, but each may bring out signs of its own. Particular care and attention are required, however, in carrying them out, and individual cases will suggest modifications in the way of performing palpation, or using the fingers for digital examination, which may be decidedly helpful. When thus practised, not only are these methods in the large majority of cases completely satisfactory in their results, but no instrument can possibly take their place, or give the information they are capable of affording. If, therefore, they are neglected or set aside, there will always be the danger of overlooking important morbid conditions, or of being led into serious error, by relying too much upon the more scientific appliances employed for investigating the cardiac action. Another point to which I desire to call attention in this connection is the distinct help which auscultation sometimes affords in studying the movements of the heart, especially direct auscultation. The sensations thus conveyed to the head enable us to estimate certain characters of the impulse even better than the fingers; while auscultation may also detect disorders of movement which cannot be felt. When the stethoscope is applied over the heart, the motion conveyed to the instrument is sometimes so amplified in its range by the distal end, as to be useful for demonstration to bystanders. Some authorities are fond of using little paper flags and the like, for such demonstration, and in certain cases they may be helpful. With regard to the cardiograph, and other more or less elaborate apparatus for studying the movements of the heart, of course there is no objection to them, so long as they are kept in their proper place. They may be serviceable, more especially for recording purposes, and no doubt sometimes reveal or bring into greater prominence points of interest which cannot otherwise be recognised. At the same time, I question whether they are of much practical value from a clinical aspect.

It must be assumed that the clinical investigator is familiar with the physiology of the cardiac action, and with the main facts relating to the normal impulse. The general nature of the points to be noted in its examination may be thus indicated :—

(*a*) Whether any movement can be detected at all, either by sight or touch, for it must be borne in mind that there are conditions which, for different reasons, render the impulse of the heart quite imperceptible.

(*b*) The situation of the ordinary impulse; at the same time making out as accurately as possible its extent, or the area over which it is seen and felt, and whether its limits are well defined or not. The determination of the precise position of the apex beat is an important detail coming under this head, and although, as I have already pointed out, it ought not to be regarded as synonymous with the impulse, yet in a considerable number of cases, even where the heart is actually affected, they practically correspond. In some instances it may be observed that the impulse differs in its exact position with different beats, and this may be a fact of importance.

(*c*) The force or strength of the impulse, and whether this is equal or unequal in successive beats. Extreme feebleness of the cardiac action is one of the causes which may render it entirely imperceptible.

(*d*) The characters of the movement. This part of the investigation often demands particular care, as it gives information of the highest clinical value. It will suffice to illustrate the point by the well-known heaving quality of the impulse, the undulatory movement observed over the præcordium in certain conditions, and the systolic recession of different parts sometimes met with.

(*e*) The frequency and rhythm of the heart's beats. Apart from counting these beats, the most important deviations from the normal, coming under this head, are irregularity and intermittence. Occasionally there are curious disorders affecting the rhythm of the cardiac movements, as they are associated with different parts of the heart, and these may require some study before they can be properly understood.

The particulars just referred to in connection with the cardiac impulse or movement must be duly regarded in their mutual relations in an individual case. It is also customary to call attention to the effects of change of posture upon the apex beat, but this matter will be alluded to separately later on. It may be noted here that a diastolic impulse or shock is felt in some instances, usually towards the base of the heart, but while it is recognised during the examination of the cardiac movements, it has a peculiar significance of its own. I have already intimated that there may be more than one impulse to be studied in connection with this organ, and it is always well to pay special attention to the epigastrium, and to investigate any movements in this locality on the lines just indicated.

3. *Special tactile signs—Thrill, etc.*—The phenomena which come under this category are the different cardiac thrills, which are common enough; and pericardial friction fremitus, which is exceptional. They can only be recognised and studied by the sense of touch, and due care must be exercised in employing this method for the purpose. Of course they are brought out by the action of the heart, and it is customary to describe thrills, at any rate, in relation to the impulse. This is quite a mistake, however, and I am strongly of opinion that they should be studied separately and independently—first, inasmuch as they constitute in themselves very definite and important signs of particular morbid conditions; and, secondly, because in most instances a thrill has no actual association with the systolic impulse. Even when felt at the apex, it usually differs from this impulse in its time, or is double; while a thrill, even if systolic, is not uncommonly observed quite away from this spot, over some other portion of the cardiac area, where there is no obvious movement. Sometimes the combination of sensations felt over the præcordium is very remarkable, and may be somewhat puzzling. I have at this moment under my observation a case in which there is an extensive heaving motion over the cardiac region, accompanied with a marked diastolic impulse, due to the closure of the pulmonary valves, three distinct thrills if not more, and a superficial sensation very like pericardial friction fremitus.

4. *Percussion signs—Cardiac dulness.*—It may be remarked at the outset that percussion is practically carried out, in relation to the heart, for the purpose of studying sounds. Though the tactile sensations elicited over this organ and its enclosing pericardium should not be entirely disregarded, as a matter of experience they rarely convey any positive or reliable information, and will not be further referred to here. Obviously the heart is an organ which in itself can only yield an absolutely dull sound, and normally it gives rise to a more or less definite area of "cardiac dulness" over

ON THE SYSTEMATIC PHYSICAL EXAMINATION OF THE CHEST.

BY FREDERICK T. ROBERTS, M.D., F.R.C.P., *Professor of Medicine and of Clinical Medicine, University College; Physician to University College Hospital; Consulting Physician to Brompton Consumption Hospital, London.*

(*Concluded from page* 145.)

II. EXAMINATION DIRECTED TO THE RESPIRATORY SYSTEM.—We have now arrived at a stage in the examination of the chest in which the two important systems, the respiratory and cardiovascular, must receive separate attention and study; though it should never be forgotten that abnormal signs, associated with either of these systems, are not uncommonly of essential service in the diagnosis of morbid conditions affecting the other system. Moreover, it is by such signs that we mainly recognise diseases affecting other intrathoracic structures; while they are often produced or modified by abdominal conditions. As a rule, it is convenient to begin with the respiratory apparatus, unless there are obvious indications that the case is practically one of pronounced cardiac disease. I propose, therefore, now to discuss the further course of procedure to be followed in relation to this system.

1. *Respiratory movements.*—The intelligent and systematic clinical study of the movements of breathing is not only extremely important, but is in reality one of the most difficult parts in the examination in not a few cases. It often demands the most methodical investigation, as well as concentrated attention, before it can give any reliable results. Obviously, the ability to carry out such investigation in anything like a rational manner implies a previous knowledge of the physiology of the respiratory movements, comprehensively and in its various details, the diaphragmatic as well as the chest movements being duly taken into account. How far such knowledge is possessed by the average student I will not now stop to inquire. Further, the deviations from health are numerous and may be complicated, so that it is very desirable to have a tolerably clear conception beforehand of what they might be, both as a general guide in the investigation, and to enable the clinical observer to recognise the abnormal phenomena which may be met with in any particular instance. The movements should be first studied during quiet respiration, without conscious knowledge or help on the part of the patient; and then during deep or forced breathing, if circumstances permit. In order to perform this act properly, the individual has not uncommonly to be taught how to do it, and a personal demonstra-

signs which they reveal, of the nature of pulsatile or other movements, venous dilatation, thrills, sounds or murmurs, and other phenomena, ought to be sufficiently familiar to anyone who has adequately studied the subject. I must again draw attention here to the value of direct auscultation in the examination of the aorta, more particularly in recognising and estimating any pulsatile movement in connection with this vessel. As a matter of course, the radial pulse will probably be investigated; but in many instances it is also desirable to note any signs presented by the temporal or brachial arteries. The relation of enlarged superficial veins to conditions within the thorax, causing pressure upon one or other of the larger venous trunks, has already been referred to.

IV. EXAMINATION DIRECTED TO SPECIAL METHODS AND SIGNS. — In the preceding remarks my object has been to give a practical outline of the application of the common and ordinary methods of physical examination to the clinical investigation of the chest from without, which will suffice for the great majority of cases. I must, however, not omit to point out that, under certain circumstances, special modes of examination are called for in relation to this region, or special signs have to be brought out in a particular way. Thus, the effects of changes of posture and movement upon certain physical signs are, in suitable cases, well worthy of study, both with reference to the respiratory and circulatory systems, but due care must be exercised in cases where such disturbances might be dangerous. Again, the production of the "bell sound," by percussion with coins, is sometimes of conspicuous diagnostic value; and the same remark applies to "succussion signs," both tactile and auscultatory. Allusion may also be made here to the mediastinal auscultatory signs produced by movements of the arms, to which special attention has been called by Dr. George Perez. Of course cases are met with in which there is legitimate need for the employment of some special apparatus, such as the spirometer, to determine the "vital capacity," the pneumatometer, the cardiograph, or the sphygmograph. I have already referred to the essential value of the laryngoscope in some instances. Nor as a means of diagnosis must the use of the exploring trochar, or some similar instrument, be forgotten or neglected, when it is really likely to be of service. These illustrations will suffice for the point now under consideration. Of course the sputum must be duly investigated when required; and although this does not come under the category of "physical examination" of the chest, it deserves special mention as an important aid to diagnosis. Now and then it may be worth while to examine the expired air.

V. EXAMINATION IN RELATION TO SPECIAL MORBID CONDITIONS. —There are certain intrathoracic diseases which, when suspected, or more or less obviously indicated on general grounds, ought, in my opinion, to be investigated on special and definite lines, differing in regard to each condition, though the signs really come mainly under the categories discussed in this communication, many of them being merely modifications of signs associated with the respiratory and circulatory systems. Without further comment, I will only mention, as illustrations, aneurysms of various kinds, glandular enlargements and other intrathoracic tumours or growths, certain affections of the main air passages, and œsophageal diseases. I cannot deal with this aspect of the subject in the present article.

The following tabular arrangement may help to bring into prominence the main points discussed in the preceding pages; and by contrasting the objects of physical examination and the methods employed in their investigation, to indicate concisely the intention and meaning of the proposed scheme:—

Objects or Signs to be Studied.	Methods.
I. General Examination.	
1. *Superficial Structures.* (*a*) Condition of normal structures. (*b*) Morbid conditions.	Inspection. Palpation. Percussion. Auscultation.
2. *Size and shape of Chest.* (*a*) Normal chest. (*b*) Enlargement or contraction. { General. Unilateral. Local. (*c*) Deformities. (*d*) Intercostal spaces, costal angle, etc.	Inspection. Palpation. Mensuration. Cyrtometer. Perigraph. Special instruments.
II. Examination of the Respiratory System.	
1. *Respiratory Movements.* (*a*) During quiet breathing. (*b*) During deep or forced breathing.	Inspection. Palpation. Mensuration. Cyrtometer. Special apparatus.
2. *Special Tactile Signs.* (*a*) Varieties of fremitus. (*b*) Degree of firmness or resistance on pressure; elasticity, etc. (*c*) Fluctuation and other special sensations.	Palpation. Digital examination.

OBJECTS OR SIGNS TO BE STUDIED.	METHODS.
3. *Percussion Signs.* (*a*) Changes affecting pulmonary resonance. (*b*) Special percussion sounds. (*c*) Tactile sensations.	Percussion. *Direct* as well as *indirect* percussion may be of service.
4. *Auscultatory Signs.* (*a*) Respiratory sounds. (*b*) Adventitious sounds. (1) Râles and rhonchi. (2) Pleuritic friction sounds. (*c*) Vocal and cry resonance ; whisper. (*d*) Tussive resonance ; effects of cough on other signs.	Auscultation. *Direct* auscultation is of great service in some cases, and should not be neglected.
III. EXAMINATION OF CARDIO-VASCULAR SYSTEM.	
1. *Local Change in Conformation of Chest Wall.*	As under general examination.
2. *Cardiac Movements.* (*a*) Changes affecting ordinary systolic impulse and apex beat. (*b*) Abnormal impulses. (*c*) Diastolic impulse or shock. (*d*) Systolic recession.	Inspection. Palpation. Digital examination. Auscultation, especially *direct*. Cardiograph and other special apparatus.
3. *Special Tactile Signs.* (*a*) Thrill. (*b*) Pericardial friction fremitus.	Palpation. Digital examination.
4. *Percussion Signs.* (*a*) Cardiac dulness. (*b*) Peculiar sounds. (*c*) Tactile sensations.	Percussion. Auscultatory percussion.
5. *Auscultatory Signs.* (*a*) Cardiac sounds. (*b*) Endocardial murmurs. (*c*) Pericardial friction sounds.	Auscultation. *Direct* auscultation often useful.
6. *Examination of Vessels.* (*a*) Aorta and main branches. (*b*) Radial, brachial, temporal. (*c*) Veins of neck, etc.	Inspection. Digital examination. Auscultation.

IV. Examination directed to Special Methods and Signs.

1. Effects of change of posture and movement.
2. Bell sound; succussion signs.
3. Mediastinal auscultatory sounds.
4. Special instruments—spirometer, pneumatometer, cardiograph, etc.
5. Exploring trochar, etc.
6. Laryngoscopy.
7. Examination of sputum and expired air.

V. Examination in relation to Special Morbid Conditions.

Aneurysm, intrathoracic growth, œsophageal disease, etc.

ACUTE DILATATION OF THE HEART, OCCURRING IN THE COURSE OF CANCRUM ORIS.

By Thomas Oliver, M.A., M.D., F.R.C.P., *Physician to the Royal Infirmary, Newcastle-upon-Tyne.*

Cancrum oris is not a very common affection, but in reporting the subjoined case I am influenced less by the desire to detail its symptoms or discourse upon its pathology, than simply to draw attention to an interesting phenomenon that occurred in its course, namely, rapid dilatation of the heart. Patient was apparently a healthy girl. As her illness progressed, the area of cardiac dulness was observed to become rapidly larger, and a mitral murmur developed, the physical signs of which gradually became modified as health was regained.

Marion B., æt. 17 years, a domestic servant, was admitted into the Infirmary, under my care, on June 18, 1896, suffering from swelling of the left cheek and ulceration of the mouth, of three weeks' duration. Her father died from brain fever; her mother is alive and well; patient has only one sister, said to be rather delicate. She has had a comfortable home and has been well fed. Three weeks before her admission patient began to suffer from faceache, which she attributed to a decayed tooth. A day or two subsequently an ulcer formed in the mouth behind the left upper incisor teeth. This was followed by swelling of the cheek and ulceration of its inner surface. The pain continued, and was accompanied by frequent shiverings and by a feeling of extreme prostration. When I first saw her the left cheek was considerably swollen, red, and indurated, and the left half of the upper lip was swollen and protruding. There was a large brawny swelling below the chin, and the breath was very offensive. The teeth were loose, the gums were red and ulcerated in places. On the floor of the mouth there was a large ulcer, covered with an adherent yellow slough, and another on the inside of the cheek opposite the upper canine tooth. This, too, was covered with slough. Although patient had a cough, there was at this stage nothing detected in the lungs. The heart was normal; its impulse was felt in the fifth interspace internal to the nipple, and its sounds were quite healthy. Temperature on admission was 102° F. Nourishing liquid foods were prescribed, and the mouth irrigated with Condy's fluid and subsequently by boracic acid lotion. On 21st June, while the mouth looked healthier, she complained of more cough, greater shortness of breath, and of pain in the right chest. Friction sounds were detected over the right base, and bronchial râles all over the lungs. Although the mouth seemed better, there was still a considerable quantity of purulent discharge, some of which had evidently trickled backward and down the trachea, setting up a septic bronchitis. On the following day the bronchitis was much worse; patient seemed very ill, pulse was 140 per minute, and rather irregular. The area of cardiac dulness had increased, the impulse of the heart was flapping and more diffused than hitherto; the apex beat was felt between the fourth and fifth ribs, half an inch external to the left nipple. The urine was healthy.

4th July.—For some days after the last note was taken, patient was too ill for any prolonged examination to be made, but we noticed that the area of cardiac dulness had rapidly extended, that the apex was beating 1½ in. external to the nipple, and that over this area there was heard for the first time a loud blowing systolic murmur. It was clear that the heart had undergone very acute and rapid dilatation. There was slight enlargement of the area of splenic dulness. On examination of the blood, the red discs were observed to be paler than usual—they formed rouleaux; the white corpuscles were increased in number. One c.mm. of blood contained 3,300,000 coloured discs, there was 1 white to 240 red corpuscles, a few poikilocytes and macrocytes. By degrees patient's health began to improve, and with that the heart gradually became reduced in size.

Reverting to the condition of the mouth for a moment, I should mention that on the sixth day after admission of the patient the left cheek became perforated immediately under the left ala nasi. Through the opening there came away pus and a slough, but for some time there remained a hard phlegmonous induration of the surrounding tissue. As the opening was the size of a penholder and extended completely through the cheek, we were able to irrigate the mouth more effectively by means of antiseptic lotions than we previously could through the separated lips. In a few days there was marked local improvement, and shortly afterwards her general state also seemed better. At this stage of the illness she was taking digitalis, nux vomica, and ammon. carb.

On 6th July the apex beat of the heart was felt 1 in. below the left nipple and in a line with it. The mitral systolic murmur was still loud and readily heard.

By the 7th July the perforation in the cheek had almost closed; the tissues around the opening were softer, much less indurated, and not nearly so painful to the touch. Cough had, practically speaking, disappeared. The pulse was 50 to the minute, full and regular; the mitral murmur remained unaltered. No râles were detected in the lungs. On the following day it was noted that the apex of the heart was felt beating in the fifth interspace, a quarter of an inch internal to the nipple.

15th July.—Patient is much improved; apex beat of the heart is half an inch internal to left nipple. A loud blowing mitral systolic murmur is heard over the apex area, but not at the inferior angle of left scapula. The second sound heard over the pulmonary artery is accentuated.

From this date patient gradually recovered. Her left upper canine tooth has been shed and a sequestrum of bone has come away. There is very little deformity, however, although the skin close under the left ala nasi is firmly bound down by tense cicatricial tissue to the bone underneath.

We could find no cause for the illness. Patient had not passed through any exhausting fever, for example, neither had she been exposed to the influence of bad hygienic surroundings, nor to deprivation of food. The disease was principally located in the left side of the face. All my previous cases of cancrum oris had occurred after measles, and the disease has in every instance been left-sided. My last patient was older than the majority of those who suffer from cancrum oris, for the illness is more frequently met with among children of tender years, say 3 to 6, than at 17.

The principal point of interest in the case is the rapidity with which the heart dilated. When the patient came under observation, it was then noted that her heart was healthy, and its area of percussion normal. In the course of the illness the apex of the heart could be seen getting carried out further and further daily, and all at once a mitral systolic murmur developed, and the pulse became rapid and irregular. The heart dilated owing to malnutrition of the myocardium, either from fever or the poisoned blood, and the mitral systolic murmur that developed was adynamic rather than endocarditic. There was no albuminuria and nothing of the nature of heightened arterial tension at any time to explain matters. It is no uncommon circumstance to find the heart dilate in fever and to become a source of great danger. In the case of cancrum oris just reported there was never any great pyrexia, so it is to the action of toxins in the blood that must be attributed the malnutrition and subsequent dilatation of the heart. As the patient improved under treatment, it was interesting to watch the gradual reduction in the size of the organ and the return of the apex beat to within the nipple line. One of the earliest signs that the heart was dilating was the irregularity and rapidity of the pulse. When the patient was examined several months after her recovery, the mitral systolic murmur could still be heard, but she had put on flesh and was enjoying good health.

THE EARLY DIAGNOSIS OF CANCER OF THE STOMACH.[1]

By W. Soltau Fenwick, M.D. (Lond.), M.R.C.P., *Physician to the London Temperance Hospital and to the Evelina Hospital for Sick Children.*

Modern surgery has achieved so many brilliant successes, that the removal of what has hitherto been regarded as an incurable disease of the stomach no longer seems to be outside the realms of possibility. Unfortunately, the success of all operative measures depends to a great extent upon the early recognition of the disease for which they are undertaken, and in no complaint is an early diagnosis more difficult to make than in cancer of the stomach. In former days, when the treatment was merely palliative, the presence of a tumour was considered to be the only infallible sign of the disease; and even now few physicians will commit themselves to a positive diagnosis, in the absence either of marked dilatation of the stomach, or of a palpable tumour in connection with the organ.

Recent investigations, however, have brought to light several facts of considerable importance in connection with the development of gastric carcinoma, by the help of which the disease has been diagnosed and successfully extirpated at a stage of its growth which a few years ago would have been considered impossible. It is with the hope of drawing more attention to this important subject that the following notes have been put together.

General symptoms.—Cancer of the stomach is rare before the age of 40, and is slightly more frequent in men than in women. Heredity plays an important part in the etiology of the complaint, for it is found that in about 8 per cent. of all cases some near relative of the patient has suffered from cancer, either of the liver, stomach, bowel, or breast. The majority of the subjects of gastric carcinoma state that they have previously enjoyed exceptional health, and it is extremely rare for any active organic disease to coexist with the gastric malady. Even when the patient has suffered from phthisis in early life, the tubercular mischief becomes quiescent before the development of the carcinoma. It is also interesting to observe that many patients will boast that they belong to an unusually long-lived and healthy family, their parents and grandparents having succumbed to natural decay at a very advanced age. The disease occasionally follows a blow on the stomach, and sometimes attacks the edges or scar of a simple chronic ulcer. The complaint is usually described in text-books as commencing insidiously with pain and other symptoms of dyspepsia. This, however, is by no means invariable, for some of the most malignant cases commence in a manner so abrupt as to closely simulate acute gastric catarrh. A good example of this lately came under my notice, in the person of a medical man practising in London, who, while apparently in perfect health, indulged rather too freely at a public dinner, with the result that on the next day he suffered from the usual symptoms of acute indigestion. But instead of improving after a day or two, the stomach continued intolerant of solid food, and within a week even milk gave rise to discomfort. The patient rapidly lost flesh and strength, a nodular tumour made its appearance in the region of the lesser curvature, and death occurred at the end of five months from cancer of the body of the stomach, with numerous secondary growths in the liver and peritoneum. More frequently the disease commences with the symptoms of subacute gastritis, which recur at short intervals without obvious cause, until the development of some characteristic phenomenon demonstrates the real nature of the complaint. *Loss of appetite* or actual aversion to food constitutes one of the earliest symptoms which call for medical advice. Thus, a few years ago, a woman of middle age came under my care for what was supposed to be a neurosis of the stomach. Her only complaint was that for several weeks she had been unable to enter a butcher's shop to give the necessary household orders, because the sight of the raw meat made her vomit. She had also developed a most profound dislike to animal food, and restricted herself entirely to eggs, milk, and farinaceous substances. There were no symptoms of dyspepsia, nor could any signs of gastric disease be detected. A few weeks later the anorexia became complete, the patient rapidly lost flesh and strength, suffered from severe pain in the epigastrium, and finally died at the end of eleven months, from medullary carcinoma of the body of the stomach. Progressive *emaciation* and *anœmia* are amongst the earliest objective symptoms of the disease, and must always be regarded with the utmost suspicion, when associated with a painful form of dyspepsia occurring after middle life. Finally, it must be borne in mind that *loss of energy*, or a feeling of extreme fatigue in the early hours of the afternoon, frequently occurs in connection with abdominal cancer; indeed, it is not unusual for medical advice to be sought, in the first instance, solely on account of this feeling of extreme weakness and lassitude.

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[1] Abstract of a lecture delivered at the London Temperance Hospital, Nov. 11, 1897.

LOCAL SYMPTOMS.—It is generally agreed that cancer of the pylorus is twice as common as disease of the body of the stomach, and that a growth in the latter position is encountered about three times as often as epithelioma of the cardiac orifice; or, in other words, out of one hundred cases, sixty will present disease of the pylorus, thirty infiltration of the walls of the organ, while in the remaining ten the cardiac orifice will be affected. It is obvious, therefore, that although there may be certain general symptoms which are common to all forms of the disease, the local phenomena will vary considerably, both in their nature and severity, according to the anatomical situation of the malignant growth.

Pain in the abdomen is present in about 90 per cent. of all cases of cancer of the stomach. The site of its maximum intensity varies to a certain extent with the position of the morbid growth, being situated behind the lower end of the sternum in disease of the cardiac orifice, but in the epigastrium or right hypochondrium when the body of the stomach or the pylorus is affected. As a rule, the symptom is most marked when the orifices of the organ are involved, but it is often severe when the posterior wall is attacked by a rapidly growing tumour. The chief characteristics of this variety of gastric pain are (1) its constancy, (2) the slight relief afforded by vomiting or hæmatemesis, (3) its tendency to sudden exacerbations. In its most typical form the pain is lancinating in character, and radiates from the epigastrium into the umbilical and hypochondriac regions, and upwards over the chest and back. In other cases it is described as a dull, aching, burning or gnawing sensation, from which it is impossible to distract the attention. When once it has become established, the pain continues constant, but is usually increased by the ingestion of food. Sudden exacerbations are apt to occur from time to time, and probably owe their origin either to catarrh of surrounding mucous membrane, ulceration of the surface of the growth, or to peritonitis over its external aspect. In this latter connection it may be observed that pyloric cancer is always most painful when the stomach is fixed to the liver by adhesions.

Vomiting is observed in about 85 per cent. of all cases, being an almost invariable symptom when the orifices of the stomach are affected, but less common when the body of the organ is the seat of the disease. In the early stages of cancer of the cardia this symptom only follows the ingestion of solid food; but as soon as the orifice has become stenosed, even liquids are regurgitated, unless swallowed with great deliberation. When the pylorus is implicated, vomiting first makes its appearance in the early morning, or after breakfast, and seems to arise from the coexistence of gastric catarrh; but as soon as the organ undergoes dilatation, the emesis occurs at irregular intervals, and the vomited material is copious in amount. When the symptom accompanies cancer of the body of the stomach, it often occurs independently of food, and has for its object the expulsion of offensive mucus or altered blood.

Hæmatemesis is less common in cancer than in ulcer, though it probably occurs to a greater or lesser extent in 40 per cent. of all cases. The blood appears to ooze from the capillary vessels of the diseased mucous membrane, or from those of the neoplasm itself, and consequently presents certain characteristic features. In the first place, though the hæmorrhage is scanty, it often continues for several days, or even weeks, sometimes being distinct to the naked eye, while at others microscopic or chemical tests are required for its detection. In the second place, owing to its long residence in the stomach, the blood is apt to undergo chemical changes, which deprive it of its characteristic colour, and render it brown, black, or gritty. Lastly, it may be observed that melæna is rare unless the hæmorrhage has been exceptionally severe.

Hæmatemesis is most often encountered in cases of medullary cancer of the stomach, but it also occurs from ulceration of a scirrhous growth at the pylorus. It is comparatively rare in disease of the cardiac orifice, unless directly excited by an attack of retching or the passage of a tube. It may also be noticed that the blood from this part is bright red, and mixed with alkaline mucus or undigested food. A severe hæmorrhage, like that met with in simple ulcer, can only arise from destruction of a large vessel, and usually proves fatal.

Constipation exists in about 95 per cent. of the cases of cancer of the stomach, and is most pronounced when the orifices of the organ are attacked by the disease. Sharp attacks of diarrhœa are apt to supervene from time to time, owing to decomposition of the intestinal contents, and occasionally looseness of the bowels constitutes so prominent a feature of the case as to lead to an erroneous diagnosis of intestinal disease.

PHYSICAL EXAMINATION.—1. *Determination of the size of the stomach.*—The ease with which this can be effected varies in different cases, but, as a rule, the dimensions of the organ can always be determined by the expenditure of a little care and trouble. In thin people a dilated stomach can often be seen in the form of a protuberance in the umbilical region, while the normal fulness of the epigastrium is replaced by a transverse furrow. If the pyloric orifice is obstructed, the peristaltic movements of the organ may also be observed. Percussion of the stomach is beset by so many fallacies, that this method alone should never be relied upon. Thus, gaseous distension of the colon, which usually accompanies gastric carcinoma, makes it difficult to distinguish the lower margin of the stomach; while, if that organ contains much fluid, the location of the great curvature may be obscured by gravitation of the gastric contents. In all cases where percussion is employed, the examination should be made when the stomach is empty, and repeated after the patient has swallowed a tumblerful of aerated water. The succussion sound obtained by manipulating the stomach, when partially filled with air and fluid, is a useful method of correcting the results obtained by simple percussion, since the lower border of the organ corresponds fairly accurately with the lowest level at which lateral pressure on the abdomen produces the characteristic splash. Some authorities prefer to distend the stomach with gas by means of draughts containing tartaric acid and bicarbonate of sodium, or to forcibly inflate the organ by pumping air into it through a tube. Personally, I invariably employ the method of auscultatory percussion, and have found it by far the most convenient and accurate means of determining both the upper and lower limits of the viscus.

Dilatation of the stomach most commonly arises from stenosis of the pylorus, and consequently is invariably present when cancer affects that region of the organ. On the other hand, when the cardiac orifice is attacked, the stomach becomes contracted from want of food, and it is often impossible to determine the exact position of the organ, owing to its retraction beneath the left costal arch. Cancer of the body of the stomach is seldom accompanied by marked dilatation, and not infrequently the viscus becomes contracted from infiltration of its walls by the malignant growth.

2. *Detection of a tumour.*—A palpable mass arising from cancer of the stomach seldom appears before the third month of the disease, and in many cases is absent altogether. In order to ensure its detection, the examination should be conducted when the stomach is empty, and after the bowels have been thoroughly evacuated by an enema or a purge.

In all cases the patient should lie upon his back, with the shoulders slightly elevated, and the knees supported by a pillow. When the lesser curvature is the seat of the disease, the tumour usually occupies the upper part of the epigastrium, just below the point of the ensiform cartilage; but in cases of cancer of the pylorus, search should be made in the right hypochondrium near the tip of the ninth rib, or in the region of the umbilicus. In the former case the tumour is somewhat elongated in form, and situated transversely or slightly obliquely to the median line of the abdomen. Its lower margin is well defined, its surface nodular, and the whole extremely tender on pressure. The connection of the growth with the stomach is determined by its position and by the fact that it moves freely on respiration. If the outlines of the organ are mapped out upon the skin with a pencil, it is found that the tumour occupies the site of the lesser curvature; while, if the stomach is distended with gas, the mass often disappears, owing to the elevation and rotation backwards of the inflated viscus. This latter phenomenon explains the necessity of always examining the stomach in the fasting state. The percussion note over the tumour varies with its position and extent, but as a rule comparative dulness may be elicited by a light stroke of the finger, while a tympanitic sound becomes audible on more forcible percussion. In many cases the stomach becomes adherent to the liver in the vicinity of the growth, and in such a sense of thickening or resistance may take the place of a distinctly nodular mass. When secondary deposits occur in the liver, the enlargement of that organ may completely obscure the gastric tumour, and in the absence of vomiting and pain the case is very liable to be mistaken for one of primary hepatic disease. When cancer attacks the posterior wall of the stomach, there is seldom any tumour to be detected; and, indeed, the whole of the posterior aspect of the viscus may he infiltrated by the growth, without any other local indication than pain on pressure.

A scirrhous tumour of the pylorus varies in position with the degree of dilatation of the stomach and the presence of adhesions. When the stomach dilates, it tends to assume a vertical position, and the pylorus describes an arc of a circle, the centre of which is situated at the œsophageal opening in the diaphragm, and descends obliquely towards the median line of the abdomen. The tumour is usually round or oval in outline, easily perceptible to the touch, smooth on the surface, and very tender on pressure. Its connection with the stomach is demonstrated by tracing the outlines of the organ on the skin, and by observing that the tumour moves downwards on inspiration; while the absence of adhesions is shown by the fact that slight pressure with the hand will prevent its ascent during expiration. When the pylorus is fixed to the liver, the tumour is situated in the right hypochondrium, near the tip of the ninth rib. It moves readily on respiration, but cannot be fixed in one position by pressure with the fingers. Owing to the sheltered position of the cardia, a tumour arising from cancer of this part of the stomach can seldom be detected, unless there is also extensive infiltration of the tissues in its vicinity. Of recent years trans-illumination of the stomach has been employed for the detection of cancerous tumours, but the value of this method is still a matter of discussion.

3. *Examination of the contents of the stomach.*—The first exploration of the stomach with a soft tube should be made in the early morning, before any food has been taken. The first point worthy of notice is the ease with which the instrument can be inserted. If it can be passed smoothly and quickly into the stomach, without exciting pain, it is probable that the cardiac orifice is free from disease. On the other hand, if the point becomes arrested in the œsophagus, while further attempts at insertion are attended by pain and choking, the free end should be closed with the finger, and the instrument withdrawn. Any material evacuated in the eye of the tube is then collected and examined with the microscope, for the presence of blood or particles of cancerous tissue. If the tube has been passed into the stomach, the patient should be directed to cough, while at the same time pressure is made over the epigastrium. By these means any material which the stomach may contain is forced up the tube and can be collected for examination. Under normal circumstances, the fasting stomach is either empty or at most contains a few

drachms of mucoid fluid; but if its muscular tissue has become enfeebled from any cause, the food undergoes stagnation, and a quantity of undigested material can be extracted in the early morning. Although this condition of gastric inefficiency may arise from several causes, it is always most obvious when the pyloric orifice is obstructed, and consequently the presence of chyme in the fasting stomach is one of the most constant and important of the earlier signs of cancer of the pylorus. When the body of the stomach is affected with malignant disease, retention of food is insignificant in degree, but a small quantity of foul mucus and altered blood may be evacuated by the tube.

Free hydrochloric acid.—In order to investigate the secretory power of the stomach, the organ is first washed out, and the patient then indulges in a breakfast, consisting of a slice of dry bread and butter with a cup of weak tea. One hour afterwards the tube is again employed, and the organ evacuated. The semidigested food is then filtered, and the reaction of the filtrate tested with litmus paper. The presence of free hydrochloric acid is determined by the appearance of a rose-red colour, when a few drops of the filtrate are heated in a china dish with an equal quantity of the phloroglucin-vanillin solution.[1] It is now agreed that about 88 per cent. of all cases of cancer of the stomach are accompanied by an absence of free hydrochloric acid, but since the same phenomenon occurs in chronic gastritis and atrophy of the mucous membrane it cannot be regarded as diagnostic of cancerous disease.

Lactic acid is most easily detected by means of the test proposed by Uffelmann. A drop of the tincture of perchloride of iron is added to 10 c.c. of a 2 per cent. solution of carbolic acid; the mixture acquires an amethyst-blue colour, which changes to canary yellow on the addition of lactic acid. Lactic acid arises from fermentation of food which has undergone stagnation in a stomach whose secretion is deficient in hydrochloric acid; and since these two factors, food retention and deficient secretion, are most frequently associated in cases of cancer of the pylorus, it follows that an excess of lactic acid will be an almost constant phenomenon in that complaint. The organic acid is also present in most cases of cancer of the body of the stomach. In case of doubt, it is wise to administer a test meal composed entirely of barley broth, since bread itself often contains a small quantity of lactic acid.

In most cases of cancer of the stomach, accompanied by diminution in the secretion of hydrochloric acid, there is a corresponding failure of the peptic ferment, so that the filtrate after acidification only digests albumin slowly and imperfectly. Microscopic examination of the contents of the stomach demonstrates the existence of undigested starch, vegetable or meat fibres, with numerous sarcinæ and other micro-organisms. Occasionally blood, pus, slender bacilli, or pieces of cancerous growth can also be detected.

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[1] Phloroglucin, 2 parts; vanillin, 1 part; absolute alcohol, 30 parts.

4. *Examination of the blood.*—The number of red corpuscles and the amount of hæmoglobin are always diminished in cases of cancer of the stomach, more especially when the disease attacks the body of the organ. According to Schneyer, the increase in the number of white corpuscles, which normally occurs after a full meal, is absent in this form of gastric disease; but this statement requires confirmation.

DIFFERENTIAL DIAGNOSIS.—1. *Cancer of the cardia.*—Cancer involving the cardiac orifice of the stomach has to be distinguished from two other diseases which occasionally occur at the same spot, namely, simple ulceration and spasmodic stricture. It may be observed at the outset that cancer is seldom encountered below the age of 40, while after that age it is by far the most frequent cause of obstruction to the entrance of food into the stomach. Simple ulceration is a rare disease, and usually results either from corrosive poisoning, cirrhosis of the liver, or accompanies ulceration near the pyloric end of the organ. Spasmodic stricture is chiefly met with in anæmic and neurotic women below the age of 30, but it is also apt to attack drunkards and hypochondriacs. The early stages of cancer and simple ulceration are very similar in their nature. The patient first experiences a tightness across the chest after eating, which appears to arise from the food sticking in the gullet. This is gradually replaced by pain behind the lower part of the sternum, followed by a choking cough and regurgitation of the food, with subsequent relief of the pain. After a short time only liquids can be swallowed without pain or difficulty; while the patient loses flesh and strength, becomes disinclined for any mental or physical exertion, and suffers from profound depression. In cases of cancer these symptoms progress steadily, until at length only small quantities of liquid food can be taken without pain and vomiting. When the cardiac orifice is the seat of simple ulceration, the pain on swallowing is usually severe, and intense agony may be experienced over the whole chest and back, after the ingestion of a mouthful of solid food. The dysphagia in this disease arises from reflex spasm of the muscular tissue in the neighbourhood of the sore, and consequently it varies in severity with the nature of the food, and seldom presents the progressive characters of cancerous stenosis. Simple spasmodic stricture often develops quite suddenly, and varies greatly in severity from time to time; so that one day the patient may be able to swallow an article of diet which on the next gives rise to immediate vomiting. Actual pain is rarely encountered in these cases, and as soon as the offending material has been ejected little or no discomfort is experienced until the next meal. It may also be observed that the patient can often overcome the obstruction either by drinking before he eats or by making a forcible expiration with the glottis closed. Although loss of flesh occurs in each disease, it is far more rapid and severe in cases of cancer, while cachexia is never present except in the malignant complaint. Hæmatemesis may occur both in cancer and ulcer, but in the former it is small in quantity, and is chiefly observed after a severe attack of retching or the passage of a tube. The bleeding which accompanies simple ulceration is usually copious in amount and is followed by melæna, or large quantities of black blood may be voided by the bowel, without any hæmatemesis. Hæmorrhage never occurs in cases of simple spasmodic stricture. A certain amount of information may be gained by investigating the sound produced by swallowing a mouthful of water. Under normal circumstances, if the stethoscope be applied below the ensiform cartilage, the fluid can be heard to enter the stomach with a gurgling sound, about seven seconds after deglutition. Should there exist any obstruction to the descent of the fluid, the sound will be proportionately delayed; while, if the cardiac orifice is much stenosed, the sound may be entirely suppressed. In the early stages of cancer, where the obstruction is incomplete, this "deglutition sound" may not become audible for ten to forty seconds after the water has been swallowed. In simple ulceration the coexisting spasm varies in severity from time to time, so that after a period of rest the deglutition sound may be only slightly delayed; but when a few mouthfuls have been swallowed the signs of obstruction become more complete. This phenomenon is still more apparent in cases of simple spasmodic stricture, where the occlusion of the orifice of the stomach varies considerably in degree from day to day. Exploration of the œsophagus with a soft tube is undoubtedly the most important means of diagnosis which we possess at present. It is best to employ an instrument having a diameter of at least half an inch, since with a thin tube it is impossible to recognise the slighter degrees of stenosis. The instrument should be slowly inserted, until its point encounters a resistance which gentle pressure fails to overcome. It is then withdrawn for an inch or two, rotated through half a circle, and another attempt made to reach the stomach. Even if this manœuvre is not attended by success, the ease with which it can be executed demonstrates the presence or absence of spasm of the œsophagus, for if this condition is present the end of the tube is felt to be firmly grasped, and is moved or rotated with difficulty. If an entry into the stomach cannot be effected, a mark is made on the tube at the level of the front teeth; the patient is directed to make a strong expiratory effort, and the free end of the tube is closed with the finger, while the instrument is rapidly extracted. In this manner any material which may have accumulated in the lower end of the œsophagus is withdrawn, and can be submitted to chemical and microscopical examination.

(*To be continued.*)

THE CRANIUM OF THE INSANE: OSTEITIS DEFORMANS AND ACROMEGALY.

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THE normal human calvaria in the adult may be said, roughly, to vary in thickness in different places, between $\frac{1}{8}$ and $\frac{1}{4}$ in. Taking the ordinary section at which the skull-cap is sawn through for the examination of the brain, the greatest thickness exists in the frontal region, where it may slightly exceed $\frac{1}{4}$ in., the thinnest is through the parietal bone; the latter usually corresponds with the greatest breadth of the cranium, and is situated almost directly beneath the parietal eminences, where the breadth varies from $\frac{2}{16}$ to $\frac{3}{16}$ in. It is generally recognised that the bone increases in thickness with age, and is rather thicker in the male than in the female sex. According to Péan,[1] the cranial bones are one-third less thick in women. The same observer states that the right side of the skull is 1½ mm. thicker than the left; I cannot say I have noticed any marked difference in the two sides.

A fairly normal skull-cap of an adult female, removed at a line which starts immediately above the supra-orbital ridges, and carried back through the point in the occipital region most distant from the starting point, and which takes in the entire circumference of the cranium, weighed while fresh is found to be 14 oz.

Ever since the morbid lesions found in persons dying insane have been noted with any degree of accuracy, it has been observed, not only that there is greater want of symmetry in the outline of the cranium in the insane than in the sane taken as a class, but that the cranial bones also vary much more in their thickness.

The alteration that takes place is most frequently an hypertrophy of the bones. Usually this is more or less general and uniform round the entire circumference of the skull, so that we may have a calvaria $\frac{1}{4}$ in. or more in thickness throughout. It is not often, however, that this figure is exceeded in the parietal region, though occasionally $\frac{3}{8}$ in. through the frontal bone is reached. Seldom do we find thickening carried to as great an extent as $\frac{1}{2}$ in., and anything beyond that is distinctly rare, even in asylums, where such specimens are generally classed as curiosities, and not infrequently preserved.

The proportion of cases in which thickening has been said to exist amongst the insane varies considerably in the experience of different observers. Greding[2] gave 167 instances in 216 fatal cases, Balfour[3] 68 in 390 autopsies on females. The latter were early cases from Colney Hatch Asylum. The experience in Wakefield Asylum, according to Bullen,[1] has been 25 per cent., which includes both sexes. In 234 consecutive post-mortems performed by myself (144 males, 90 females), the calvaria was distinctly thickened in 51 cases (22 males, 29 females). This is a greater frequency than that at Wakefield, and the female skull is seen to be more often affected in this way than the male.

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[1] *Brit. Med. Journ.*, London, 1896, vol. ii. p. 40.

[2] Bucknill and Tnke, "Manual of Psychological Medicine," 1879, p. 543.

[3] "Pathological Appearances observed in the Brains of the Insane," *Journ. Ment. Sc.*, London, April 1874.

The frontal bone is most often the site of greatest thickening, and the occipital region comes next. When it is distinctly limited in extent, the former is generally the portion of the cranium affected. Here a diffuse form of dense bony deposit may be spread over the inner table for a considerable area.[2] Such a condition is less common than a more general thickening of the diploe between the two tables of compact bone, but is much more frequent than the distinct formation of osseous tumours. There is, however, no clear line of demarcation between a localised exostosis and a more diffuse bony mass, such as that referred to, for in the same skull both may exist, and are seen to merge in character one into the other.

"Hyperostosis," says Rokitansky, "almost always presents itself in both its forms, namely, that of deposition externally upon the bone, and simultaneous condensation of its tissue (sclerosis). In a few cases it goes on to such an extent that the skull is not only larger than natural, misshaped, and uncommonly thick, but it also acquires a weight that is almost incredible."[3]

In thirty instances in which I have made careful tracings of the external table of the calvaria from adult female lunatics, apart from irregularity in outline (a point with which I do not propose to deal), there is great want of uniformity in actual size. The whole skull-cap is found considerably larger in senile insanity, dementia, and the chronic insane conditions, than in the acute states, or even in melancholia of long duration. The smallest tracing taken is from a case of melancholia existing ten months, æt. 48 (greatest length, 6¾ in.; greatest breadth, 4⅞ in.).

The greatest length of any of these thirty crania was 7¼ in., the greatest breadth 5⅞ in. These did not occur in the same skull. It is seldom, however, that the breadth much exceeds 5½ in., which measurement is commonly associated with a length of about 7 in. There were fifteen instances in which this width was reached or exceeded. The cranium is rarely increased in size by elongation in an antero-posterior direction, but an increase usually takes place by a bulging outwards in the parietal region, frequently associated with a broadening in the frontal, so that the cranial outline acquires a more rounded form.

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[1] "An Abstract of 1565 Post-mortem Examinations of the Brain performed at the Wakefield Asylum, during a period of Eleven Years," *Journ. Ment. Sc.*, London, January 1890.

[2] A very marked case of this kind will be found figured in Clouston's "Mental Diseases."

[3] "Path. Anat.," *Syd. Soc. Translation*, vol. iii.

Before we can consider the weight of the calvaria, I must first briefly indicate the extent of bone that is referred to. This is especially important, as I shall further on have to refer to the weight of an exceedingly thick skull-cap from a case of osteitis deformans. It is the custom in this asylum to remove a portion of bone that does not take in the entire circumference of the cranium, but the part that is removed is done so on fairly uniform lines. The saw enters the frontal bone about 1 in. above the supra-orbital arch, and the line of section passes horizontally backwards towards the occipital point at a level of 2½ to 3 in. above the external auditory meatus, to a point equally distant behind the meatus, the exact distances being dependent upon the size and form of the calvaria. A slightly oblique incision is then carried down to that line, commencing at the vault of the skull, half-way between the obelion and lambda. While the removal of this portion of bone readily enables the extraction of the brain, and entirely escapes the thick occipital bone, the main object effected is the better fixation of the bone on replacement.

The weight of the calvaria thus removed in the fresh state, with pericranium attached, but temporal muscle and dura removed, was found to vary in the thirty cases between 7¼ and 14¾ oz. Several cases reached the higher figure, only one the lower. In seventeen instances the bone weighed 12 oz. or over; they were all cases of chronic mania, or dementia of long duration, except a few senile subjects. In only seven the bone weighed less than 10 oz. They were almost entirely cases of melancholia, mostly of short existence.

The large and the heavy calvaria usually correspond, but there are one or two notable exceptions. This difference is dependent upon thinning or rarefaction in the case of the large light calvaria, or more commonly increased density in the case of the small skull-cap. The two conditions, rarefaction and hyperostosis, are very frequently combined.

When we come to inquire as to the form of insanity which most frequently produces this thickening in the cranial vault, we find that experience is very uniform. The cases have usually been ones of chronic mania or such as have passed into dementia. Frequently these patients have been the subjects of marked periodical excitement. In fact, those forms of alternating insanity, in which we may suppose the brain and its coverings are subjected to temporary attacks of congestion, give us some of the most pronounced instances of this condition. General paralysis, though of short duration, ranks high. The thickened calvaria of epilepsy is of this type, but in that class there is less regularity in the bony thickening, and distinct prominences are less rare on the inner table. Senility by itself rather tends to diminish the thickness as well as the density of the bones.

The form of mental states comprised in the 234 cases examined may be summarised as follows:[1]—

Mental State.	Males.	Females.	Total.
Mania of less than two years	8	9	17
Melancholia of less than two years . .	4	9	13
Chronic mania	20	16	36
Chronic melancholia	12	14	26
Recurrent mania	8	2	10
Recurrent melancholia	1	1	2
Alternating insanity	1	2	3
Dementia following mania	9	19	28
Senile insanity	13	9	22
Imbecility	2	...	2
Epilepsy	20	4	24
General paralysis	46	5	51

Of the above, fifty-one showed a certain amount of abnormal thickening of the cranial bones. In the table are entered the leading factors that may have been instrumental in bringing about that result:—

No.	Form of Mental Disorder.	Time Insane.	Age.[2]	Previous Occupation.	Assigned Cause of Insanity.	Weight of Brain.[3]
	MALES.					
						Oz.
1	General paralysis . .	⅓ yrs.	30	Hotel porter.	...	57¼
2	Chronic mania . . .	10 ,,	72	Labourer.	Drink & heredity.	48
3	Mania	¾ ,,	52	Shoemaker.	Drink.	...
4	General paralysis . .	¾ ,,	58	Pauper.	...	...
5	Imbecile	21 ,,	21	None.	Congenital.	42½
6	Senile mania . . .	12 ,,	77	Pianoforte maker.	Old age & family troubles.	46¼
7	General paralysis . .	⅓ ,,	34	Coal-trimmer.	...	48
8	,, ,,	¾ ,,	42	Hairdresser.	Business troubles.	...
9	Dementia following recurrent mania	28 ,,	74	Silkweaver.	...	...
10	General paralysis . .	2⅓ ,,	46	Engineer.	...	...
11	Chronic mania . . .	6 ,,	43	Plumber.	Drink & heredity.	...
12	General paralysis . .	4 ,,	49	Gardener.	,,	...
13	,, ,,	2 ,,	52	Clerk.	Heredity & business troubles.	...
14	,, ,,	3¾ ,,	48	Cabman.	Drink.	...

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[1] This list gives no true criterion of the proportion in varieties of insanity occurring in Colney Hatch Asylum, not even of those proving fatal, as they only include patients from certain wards.

[2] Of the 144 male cases only thirty were above 60 years of age at death, whereas of the ninety females thirty-nine had reached that age; of the former, thirty-seven were below 40, of the latter eleven.

[3] The weight of forty-three male brains varied between 35½ and 57¼ oz.; twelve were below 45 oz. The weight of seventy-seven female brains varied between 34 and 50 oz.; and sixty-two were below 45 oz., twenty-three below 40 oz.

No.	Form of Mental Disorder.	Time Insane.	Age.	Previous Occupation.	Assigned Cause of Insanity.	Weight of Brain.
	MALES—*contd.*					Oz.
15	Epilepsy with recurrent mania	54 yrs.	76	Painter.	...	...
16	Epileptic imbecile .	24 ,,	24	None.	Congenital and heredity.	...
17	Recurrent mania . .	40 ,,	71	Shoemaker.	...	...
18	General paralysis . .	2 ,,	61	Gen. labourer.	Drink & heredity.	...
19	Chronic mania . . .	17 ,,	42	Labourer.	Injury to head.	...
20	Epilepsy with dementia	7½ ,,	71	Painter.	Old age.	...
21	Epileptic imbecile .	22 ,,	22	None.	Congenital and heredity.	36½
22	Dementia following mania	4 ,,	50	Coal porter.	...	42¾
	FEMALES.					
23	Dementia following mania	13 ,,	75	Servant.	...	...
24	General paralysis . .	3 ,,	35	Charwoman.	...	36¼
25	Chronic melancholia .	23 ,,	81	Barmaid.	...	36½
26	Chronic mania . . .	30 ,,	77	...	...	37¼
27	,, ,,	24 ,,	55	Nurse.	Injury.	41½
28	Senile mania . . .	2½ ,,	84	...	Old age.	39
29	Chronic mania . . .	13 ,,	72	Charwoman.	...	42½
30	Mania alternating with melancholia	15 ,,	43	Barmaid.	Heredity.	40½
31	Dementia following mania	22 .,	70	Costermonger.	...	34½
32	Dementia with paralysis	2 ,,	57	Nurse.	...	40
33	Senile mania . . .	½ ,,	60	Sempstress.	Drink.	38¼
34	Recurrent mania . .	8 ,,	58	...	...	50
35	Dementia with epilepsy	2 ,,	52	Washerwmn.	...	34½
36	Dementia following recurrent mania	22 ,,	49	Needlewmn.	...	49¾
37	Mania	3 ,,	45	,,	...	44
38	,,	½ ,,	44	...	...	36¾
39	Mania alternating with melancholia	10 ,,	44	Cook.	...	38
40	Senile dementia . .	1 ,,	73	...	Old age.	37¾
41	Dementia following mania	7 ,,	77	...	,,	...
42	Melancholia	¼ ,,	40	...	...	47
43	Senile dementia . .	7 ,,	80	...	Heredity and old age.	40¾
44	General paralysis . .	4 ,,	33	Governess.	...	38¼
45	Chronic mania . . .	13 ,,	58	Tailoress.	...	43¾
46	Dementia following chronic mania	38 ,,	68	...	...	46½
47	General paralysis . .	3 ,,	38	...	...	36¾
48	Dementia following mania	29 ,,	70	...	...	40
49	Epilepsy with mania	½ ,,	45	Laundress.	...	49½
50	Senile dementia . .	1½ ,,	79	...	Old age.	43
51	,, ,,	6 ,,	70	...	,,	40

In each of these the cranial bones were thickened throughout. It is only necessary to add remarks to one or two of them. In male case No. 2, the calvaria was extremely thick and dense. In No. 5, besides a general thickening, there was a localised swelling in the left temporal region, varying in width from ½ to ¾ in. over an area of 3 in. This projected almost entirely inwards, pressing upon the brain in the region of the Sylvian fissure and Broca's convolution. No history and no indication of an injury was discovered. In No. 21 the skull was of great thickness throughout, at the expense of the internal capacity of the cranium, and all bony prominences within the fossæ at the base were excessive. The left cerebral hemisphere was considerably smaller than the right, and there was localised wasting of the brain in the upper parietal region. The bone of No. 25 of the female cases was more especially thickened in the frontal region, where there was much dense osseous deposit spread over the inner table. In No. 31 the cranial capacity was considerably encroached upon by the thickened bone. As a general rule this is not particularly observable. In No. 36, not only was the calvaria greatly thickened, but the bones at the base were large and rough. In No. 46 the bone was extremely dense and hard, but the cranial capacity was distinctly above the average; the brain was well developed. The weight of the skull-cap was 14¾ oz., the average for a woman being about 12 oz.

Not one of this series showed any extraordinary degree of hyperostosis. In many of them the calvaria was little more than ¼ in. in width throughout, in others it was ⅓ in., others again reached ⅜ in., and a few attained ½ in. in their thickest parts. But every now and then cases have been recorded in the autopsy books where ¾ in. has been noted. This usually in the frontal region. These cases occur with far greater frequency among females, and certainly, judging from experience in Colney Hatch, men are less liable to excessive thickening of the cranial bones. I can only put this down to the very much longer time these females are resident in the asylum. It is well known that the average duration of insanity and age at death of female lunatics is much greater than that of men, doubtless dependent in part on the high proportion of general paralysis amongst the latter.

The following may be mentioned as instances of more advanced cases of hyperostosis of the skull in female lunatics, but further on I shall record some more remarkable cases:—

FEMALE, 4126.—A case of recurrent mania of fifteen years' duration, dying in December 1872, æt. 61. She had attacks of great violence, alternating with periods of depression. There was an hereditary history. She died a month after an epileptiform seizure, which left the left side paralysed. The calvaria was very thick, and an irregular bony deposit existed on the inner portion of the frontal bone, to the extent of ¾ in. The occipital was ¼ in. thick. The left hemisphere was shrunken; the right swollen, with the whole of its central portion of the consistency of gruel, and of a dirty yellow appearance. Arteries highly atheromatous.

Female, 1956.—Insanity of thirty-two years' duration, dying in June 1885, from erysipelas of the face and head, æt. 77. She is said to have been very stout, and had a low forehead. For years she was demented. Idiopathic erysipelas came on a few days before death, and followed a severe attack of eczema, which extended over the head a few months previously. Calvaria very thick, and from the inner surface of the frontal were irregular projecting bony deposits; very little diploe. Membranes thickened and opaque, and arteries atheromatous.

Female, 10,265.—Recurrent mania of fifteen years' duration; died March 1889, æt. 25. When admitted with a fourth attack in February 1889, it is said that her hands were small and undeveloped; she was thin and jaundiced, and had old ulceration on the outer side of right leg. The calvaria was enormously thickened and heavy, nearly ¾ in. in places. Convolutions of brain undeveloped; considerable amount of fluid present. Liver large and coarse, weighing 5 lb. 4½ oz. Spleen greatly enlarged, hard and dry, reaching to pelvis and adherent to liver, weighing 2 lb. 5 oz. Kidneys congested, the right contained a small cyst. Signs of old peritonitis. Heart small, lungs adherent at apices, pleuritis left side. It seems highly probable that this was a case of congenital syphilis.

Female, 9811.—Mania of nine months' duration; became demented, and died from paralysis, March 1888, æt. 55. She had been a well-educated woman, a governess, and her mental condition had been brought on by drink. The calvaria was congested and much thickened, internal surface of frontal bone very irregular from new bony growth. There were the remains of several old hæmorrhages in the brain, which was hardened in other parts. Membranes and ependyma thickened, arteries atheromatous.

In several other female cases, where it is mentioned that the calvaria was excessively thick and heavy with little diploe, the assigned cause for insanity has been drink.

I have only been able to discover one solitary case of a male skull reaching a general thickness of half an inch. This was an excavator, with epileptic mania of many years' duration, who died in 1853, æt. 34. The skull was over half an inch thick, and very heavy; the internal table marked by numerous deep channels; the finer membranes thickened and opaque; the brain congested, but fairly developed.

In the series tabulated, in every instance the dura is noted as being thickened, almost invariably adherent to the bone, the pia arachnoid opaque, and the brain itself usually wasted as a whole, or locally. All, in fact, show the signs of what are usually looked upon as the result of a former chronic inflammatory condition.

Although all the conditions mentioned above may exist, and may be found combined, where there is no marked thickening in the cranial bones, it is at least very exceptional to find them as advanced in such cases. Both changes in the bone and membranes occur most prominently in the same form of insanity; and where, as in all forms of melancholia of whatever duration, we find changes in the membranes less pronounced, or their condition in a normal state, so do we rarely see thickening to any extent in the bones of the skull. As mentioned previously, it is the general experience that where noticeable thinning takes place, it is in the melancholic state. The proportion of cases in which cardiovascular changes are found in the body after death in most chronic insanities, as well as in general paralysis, is very great;[1] on the other hand, in melancholia, imbecility, and epileptic insanity, where such a condition is more rare, tubercular disease of the lung is common.

As to the frequency of abnormal thinning of the cranial bones in the insane, Balfour gives it in forty-three out of his 390 female cases, while Bullen states that 20 per cent. of the 1565 mixed cases were described as decreased in thickness. These estimates appear to me to be very excessive, unless we have some very definite standard upon which to base our calculations, and unless our measurements are made with great exactness. Undoubtedly some senile cases of short duration, and others of depressed mental states, even when of longer duration, present to us after death a somewhat thinned condition of the skull, but in my experience it is exceedingly rare to find this carried to any marked extent. I am unable to give actual figures, but I should have said that it occurred in less than 2 per cent. Out of my 234 cases, in only one was thinning found to an exceptional degree.

This was a young man, æt. 31, who died from phthisis and the exhaustion of melancholia of over five and a half years' duration. He had been a clerk; no cause was stated for his attack. The skull, as a whole, was deformed and rather small. The bone forming the vault and sides was remarkably thin, in places quite translucent. This was so along the coronal suture and extending over some distance of bone immediately behind, as well as on each side of the central line of the frontal and between the parietal bones. The thinning of bone was greatest at the front and hinder part of the skull. The upper portion of the occipital bone was pushed backwards, forming a prominent ridge immediately behind its union with the parietals. The brain was fairly developed, the lateral ventricles not dilated, the membranes of normal thickness, but there was a large excess of cerebro-spinal fluid.

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[1] "The Degenerative Lesions of the Arterial System in the Insane," *Journ. Ment. Sc.*, London, January 1895.

In idiots and imbeciles such a type of skull is apparently more common, especially if associated with hydrocephalus, but of these I have had little experience. Great enlargement of the lateral ventricles, with excess of cerebro-spinal fluid, accompanying chronic brain disease in the adult, is more often associated with increased thickening of the cranium. As in the thickening, where we get increased bony deposit most markedly in the frontal region, where the bone is normally the thickest, so in cases of thinning it is the parietal bones which, as a rule, are mostly affected. This takes place by the disappearance of the diploe. The rare diaphanous skull will usually be found firm and brittle.

Personally, I have not seen any instance of very noticeable softening, but a remarkable case of this kind occurred in Colney Hatch many years ago. This case was one of a woman (4536), dying in 1872, with senile dementia of rather over a year's duration, at the age of 87. There seems to have been nothing special about the case. Here the calvaria was so soft it could be bent about with the hand, and readily cut with scissors. The diploe was congested, the inner table of a dark pinkish colour. The dura mater thickened, finer membranes opaque, with gelatinous fluid in the meshes of the arachnoid; great excess of cerebro-spinal fluid, and considerable dilatation of the ventricles of the brain, the latter being congested, soft, and œdematous. The ribs were easily fractured by pressure. There was advanced atheroma of the cardiac valves and of all arteries; the capsules of the abdominal viscera were thickened.

By writers on insanity it is generally considered that most of these changes in the bones of the cranium are brought about by excess of blood supply, to which the bones have been subjected during periods of mental excitement extending over a long period. Bevan Lewis, writing most recently on the changes found in the skull of the insane, says: "It may be due to prolonged and very chronic inflammation of the texture; although in many cases it is probably the result of repeated vascular engorgements, and the excess of nutritive plasma brought to these parts by conditions of violent cerebral excitement, occurring through a period of many years in chronic mania."[1] This, he thinks, accounts for both thickening with increased density, and for rarefaction with superficial hyperostosis. Rokitansky affirmed that atrophy of the brain frequently gave rise to deposits of bone on the inner table of the skull, but neither Bucknill nor Lewis support this theory of compensatory hypertrophy. The former points out that "some of the thickest and heaviest craniums which we have met with have occurred in instances in which there was little or no cerebral atrophy."[2]

Other influences in the production of an hypertrophy of the cranial bones are probably heredity, and the toxic action of syphilis and alcohol, doubtless acting through the vascular system and blood supply. It is not at all uncommon to find that there has been a distinct history of alcohol to excess, where marked hyperostosis of the cranium is found after death, though male cases there are, where drink and heredity have been combined which show no such change. Syphilis very likely discloses itself in general paralysis of the insane, but it must be remembered too that the brain and membranes of victims of that mental disorder have probably been subject to temporary attacks of vascular engorgement during seizures; it may be affected by actual inflammation.

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[1] "Text-Book of Mental Diseases," 1889, p. 433.

[2] Bucknill and Tuke, "Manual of Psychological Medicine," 1879, p. 567.

What relationship exists between such a condition and erysipelas is more obscure. In a number of recorded instances there has been a distinct history of repeated attacks of facial erysipelas, such as in a case I am about to mention.[1] Does the repeated inflammatory condition of the skin set up changes in the bone beneath; or are the erysipelatous outbursts a result of altered nutrition to the skin, from changes in the deeper structures? Whichever it be, there seems at least some undoubted association between the two.

(To be continued.)

ON THE TREATMENT OF SOME OF THE MORE COMMON EYE AFFECTIONS.

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(*Continued from page* 177.)

CORNEAL ULCERATION is always primary, that is, it only exists where there has been a focus of inflammation in the cornea itself, never where the focus lies somewhere else in the eye, and the corneal changes are of the nature of an interstitial infiltration. It is useful to remember this from a prognostic point of view. The two directions in which the ulceration spreads are superficially and in depth. These no doubt are the only two directions in which extension is possible, yet there is a decided clinical difference in the proportional degree of extension which may occur in them. Some ulcers invade the more superficial layers of the cornea over its whole extent, without passing so deeply as to lead to perforation. Others, again, more or less rapidly spread in depth, causing perforation, without a great extent of the cornea becoming involved. Ulcers at the corneal margin usually increase in size, in very much the same proportion in both directions, spreading superficially in a circular line round the margin, and at the same time eating through the thickness of the membrane.

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[1] A notable instance of repeated attacks of pseudo-erysipelas on the upper part of the face in acromegaly is recorded by Gauthier (*Progrès méd.*, Paris, 1892). The *Lancet*, London (30th Sept. 1893, p. 821), refers to a case published by Montgomery, of unilateral hypertrophy of the whole face following abscess of the lower jaw.

From the point of view of treatment, there is more call for effort to be made to check the superficial extension than that which leads to an increasing breakdown of the deeper corneal layers. Both extensions have, of course, their natural limitations; the former ends when the whole of the cornea has suffered ulceration; the latter, when perforation has taken place. As a general rule, however, healing is more apt to be delayed when the ulcer spreads comparatively superficially until all or most of the cornea has been destroyed; whereas the destructive process often ends after perforation in the essentially deep ulcers. This fact may sometimes be taken advantage of, especially in deep marginal ulcers, when, by opening into the interior chamber, by puncturing the floor of the ulcer, further extension may be avoided. Such treatment must not, however, be resorted to unless other attempts at arresting the ulcerative process have first been tried without success. It is better, if possible, that there should be no perforation. There is a danger of in this way permitting the entrance into the deeper parts of the eye of microbes, which may be a source of very serious complications. The danger is greater, too, apparently, when the perforation is done as a surgical measure than when it occurs in the process of inflammatory destruction. Nevertheless, the paracentesis is often a useful measure, particularly in the case of deep marginal ulcers, not only as tending to limit the extent of destruction to the cornea, but in preventing prolapse of iris, which is more likely to occur if the perforation takes place spontaneously. Prolapse, too, when it does occur, is more easily dealt with if it follows a paracentesis than if the hernia takes place through the base of an ulcer which has of itself yielded to the pressure from within. In the first case, it is recognised at the time, and can be replaced by a little careful manipulation, preferably with a thin pliable caoutchouc, or tortoise-shell iris-repositor, which should, of course, be aseptic. The iris can afterwards be kept away from the corneal wound by causing a forcible contraction of the pupil with eserine or pilocarpine. The worst that can then happen is an attachment of a point on the surface of the periphery of the iris to the back of the cornea—or an anterior synechia, as it is called—without any subsequent actual incorporation of iris tissue in the cicatrix which eventually comes to occupy the site of the ulcer. But even this may frequently be avoided. The following preparations of eserine and pilocarpine may be used for this purpose:—

℞	Eserinæ sulphatis	gr. ij
	Acidi boracici	grs. v
	Aquæ destillatæ	℥ss

℞	Pilocarpinæ nitratis	grs. ij
	Acidi boracici	grs. v
	Aquæ destillatæ	℥ss

After a paracentesis, too, the eye should be bandaged for forty-eight hours. The bandage should, however, be removed, and reapplied every eight hours, to admit of the eye being well bathed, and the myotic drops used. Where there is much secretion, the changing may be done more frequently.

Prolapse occurring after spontaneous rupture is seldom discovered until some time after it has arisen—the incarcerated or protruding iris is then more or less covered with lymph. It is caught, too, in a more ragged and more structurally altered corneal perforation, and generally held sufficiently firmly to be with difficulty disentangled. Any prolonged attempts at replacing the iris under these circumstances should not be made. They lead to laceration, and no doubt at the same time favour inoculation by the micro-organisms with which the incarcerated membrane is at least surrounded, and are very apt, therefore, to be followed by more or less serious iritis. As a general rule, it is better not to interfere at this stage at all. Even the use of myotics is probably best avoided. The ulcer may be carefully painted over with freshly prepared chlorine water, to which a little hot water from the kettle has been added, so as to bring the temperature up to blood heat or a little over, then dusted freely with very finely powdered (not sublimated) iodoform, and an occlusion bandage applied. The subsequent treatment suitable for iris prolapses will depend upon the size of the protrusion. Often in the course of the healing process a pretty marked protrusion is found to diminish greatly in size. When this takes place, and the hernia has become flattened down to nearly the niveau of the cornea, and well covered by cicatricial tissue, it is best left alone. More marked permanent protrusions should, however, be excised. They are a source of greater risk, from their liability to injury. Disturbance of their cicatricial covering may, under favourable conditions, favour inoculation by microbes, and lead to iritis and deeper inflammations of the eye. The excision should not be undertaken until all irritation caused by the corneal ulceration has subsided—generally not, therefore, until a fortnight or more after the prolapse has arisen. The object aimed at in removing the prolapse is to flatten the protrusion down so as to bring it as nearly as possible to a level with the surface of the cornea. The proper way to do this is to transfix its base at about its centre with a small narrow cataract knife. The knife is then cut outwards in the direction at right angles to its edge, its surface being all the time kept parallel to and on a level with the cornea. When the one half has thus been separated, it is seized with a pair of fine-toothed forceps, raised so that the blades of a pair of scissors can be got to close below it, and at the same time over the remaining portion of the protrusion. A snip with the scissors, pressed somewhat downwards on to the cornea, can thus be made to sever the remaining half close to the corneal surface. Attempts at removing these prolapses with forceps and scissors alone do not lead to sufficient flattening, owing to the manner in which the blades slip. After removal of an old prolapse, in the manner described, the eye may be tied up for four or five days.

In addition to the flattening down of a prolapse, cases in which this accident has happened sometimes call for further treatment. It happens not unfrequently that the pupil is visibly drawn in the direction of the corneal cicatrix. It loses its circular form, and becomes pear-shaped. Less pronounced degrees of this distortion and displacement of the pupil are of no consequence to vision, and rarely are the cause of any irritation. In the case of the larger hernias, however, the pupil may be rendered so eccentric that vision is thereby impaired; and besides, the dragging on the iris fibres, which is the cause of the displacement, may sometimes give rise to repeated attacks of congestion. In such cases, two iridectomies should be done opposite to each other, at right angles to and on either side of the central point of the prolapse, or the synechiæ remaining after the prolapse has been levelled down. The iridectomies need not be large, and may both be done at the same time, though it is easier to allow some time—a week or more—to elapse before the second is done.

Iridectomy is also called for, where the scar of a perforating ulcer, whether there be, as is most frequently the case, iris tissue incorporated with it or not, is weak, and begins to yield to the intra-ocular tension. This condition, technically called staphyloma, may indeed often be arrested by iridectomy, especially when it is partial. Moreover, it is only then that any effort to prevent further loss of vision by serious changes in the corneal curvature can be of any avail. Other operations for more pronounced degrees of corneal staphyloma are not particularly satisfactory.

The treatment suitable for corneal inflammations, which do not present themselves as ulcerations, showing a marked tendency to perforation, must vary considerably according to their nature. The treatment of some forms has already been referred to in connection with conjunctivitis, but, before discussing that which may be recommended in others, there are a few more general practical points to which attention may be directed. It is necessary to bear in mind, for instance, in connection with keratitis, that the origin of the local inflammation is perhaps most often to be found in that of some neighbouring part of the eye. One's attention should therefore always be directed to the state of the lid margin, conjunctiva, and tear sac. And this, even where the history points more or less clearly to some preceding trauma. In many cases, too, the state of the general health will have to be inquired into, and demand appropriate treatment. This is particularly the case in struma, syphilis, diabetes, rheumatism, and gout, but also, though less commonly, where other digestive or circulatory or nerve disturbances exist, or where functional or organic disorders of the reproductive system are present. In short, though local treatment may be indicated, it is comparatively seldom that nothing further is called for.

Local treatment is least essential in the case of mere infiltration, both superficial and deep, and most in the more virulent, rapidly spreading, ulcerations which have a septic origin. It used to be a common practice to content oneself with the occasional or frequent use of atropine dropped into the eye. This has no further effect on the local inflammation than to act to some extent as an anodyne. Cocaine is much more useful in this respect, and therefore should be substituted for atropine in all cases in which there is no complication with iritis. In all cases, however, the state of the iris should be looked to, and, where any marked congestion or any inflammation of that membrane exists, atropine should be used. The necessity for doing so will be more fully discussed under iritis.

All the different alkaloid solutions, used as "drops" for the eye, should be freshly prepared, and be made up with some antiseptic. They are otherwise apt to contain mycotic or other germs, and then likely to do more harm than good, by causing conjunctivitis and thus indirectly tending to keep up or even aggravate many corneal inflammations. The pipettes or glass rods used for introducing the drops, should also be rendered aseptic before use, and should never be brought into direct contact with the conjunctiva.

In using cocaine, it must be remembered, too, that the anæsthesia which it produces is liable, by causing an arrest of the tear flow and of the other secretions by which the eye is normally lubricated, to give rise to a desiccation, or even, in extreme cases, a shedding of the corneal epithelium. It is therefore well to tie up the eye for some time after its application. On this account, it should not be too constantly applied. It is useful often, and especially where the corneal condition is associated with much photophobia, to precede the examination of an inflamed cornea by an instillation of cocaine. The cocaine drops, suitable for this and other purposes, may be prepared according to the following prescription:—

℞	Cocainæ hydrochloratis . .	grs. iv–x
	Acidi boracici	grs. iv
	Aquæ destillatæ . . .	ʒij

Eserine is now more frequently used in most corneal inflammations than atropine. I have never found it to have any effect on the course of the inflammation, and consider that its use should be confined to cases where, from urgency of peripheral prolapse of iris, it is advisable to obtain a powerful contraction of the pupil.

In many corneal conditions, one sees exemplified in a way, which in other parts of the body is not so readily followed, the struggle which takes place between the vitality of the tissues and the external forces, micro-organisms, toxins, and other irritants which tend to destruction. The basis of one's treatment should therefore be, in the first place, either altogether to avoid measures calculated to diminish or inhibit the former, or make use of measures by which the vitality is temporarily increased without a swing subsequently taking place in the opposite direction. Again, our efforts must be directed towards neutralising and keeping in check the activity of the external irritants, in a manner, too, which does not impair vitality.

Both heat and cold have important influences in these respects. The application of ice, which was formerly much in vogue, has been found practically to be worse than useless. Possibly, if the temperature of the cornea could be constantly kept at the freezing-point of water, the use of ice might occasionally be of some value. The usual way of applying cold by iced compresses does not maintain the desired low temperature, and no doubt the explanation of the harm done by this treatment is the disproportion which it establishes between tissue vitality and activity of external irritants. By the ordinary applications, the lowering of the former is not compensated for by the degree of inhibition caused in the latter. This disproportion is indeed much less in the case of the different antiseptic preparations, which may be used both more efficiently and more conveniently. But inasmuch as these no doubt to some extent lower the vitality of the cornea, it is often advantageous to combine with their use that of heat directly applied. Practically, it is found, however, that although heat is more efficacious than cold, its application can be overdone. It is certainly, too, not suitable in all cases.

The effect of heat must be got as far as possible without that of poulticing. The simplest way to do this is as hot fomentations, lasting a quarter of an hour or so, every two or three hours. Dry heat may also be used, but is more troublesome to apply, and has no particular advantages. Poulticing in any form is always more or less hurtful.

The advisability of tying up the eye or not is a question which often presents some difficulty. In itself, it would seem to afford a natural means of keeping the eye at rest. In point of fact, it is, with certain exceptions, a useful treatment when properly done. But it must be remembered that there is some danger, and, in certain forms of corneal inflammation, great danger, of the tying up causing a poulticing action and a retention of the secretions, both of which may entail much more risk than is run by leaving the eye uncovered. Bandaging should therefore not be continuous, but the bandage should be removed two or three times or oftener during the day, and need not be applied at all at night. At each removal, the eye should be properly bathed with boracic lotion or hot water, which has sufficiently cooled after boiling, and any other local application which may be considered necessary, made. On account of the frequent necessity for removing the bandage, it should be in a form which can readily be replaced by the patient himself. A good form of occlusion bandage for this purpose is a piece of flannel 6 in. long and 2¼ in. wide, to each corner of which a piece of tape is sewed. The two tapes at each end converge into one. The bandage is applied over a pad of Gamgee tissue or absorbent cotton-wool. It is carried diagonally over the eye—the two long tapes being crossed at the back of the head and tied over the forehead. It should be tied comfortably tight. Knitted bandages similar in shape are also good.

The different local applications which may be used in cases of corneal inflammation (in addition to yellow oxide of mercury, to which reference has already been made, and which it must be remembered is only suitable in strumous superficial keratitis), are —iodoform, chlorine water, and boracic lotion, tincture of iodine, nitrate of silver, and the actual cautery.

Iodoform is an extremely useful application, which may be used either finely powdered (not sublimated), or as an ointment in the proportion of 1 to 8. Gelatin discs, containing iodoform, have also been used. They, however, melt rapidly, and leave very little iodoform. On this account, it is much more satisfactory to dust the pure iodoform on to the cornea, which may be done freely. The ointment, too, is not so good, but is more readily applied by the patient himself, and is, moreover, more suitable when the eye is not bandaged after the application.

Chlorine water need only be used in severe ulcerations which are rapidly spreading, either superficially or in depth. It may be used both in the form of a wash or injected subconjunctivally. The subconjunctival injection should be made with a hypodermic syringe, introduced at two or three different points. Five or six drops may be injected at each point. The chlorine water is more diffusible, and does not cause any more pain at the time, or any more reaction afterwards, than solutions of corrosive sublimate which are more generally used. Chlorine water must be freshly prepared. If it has stood for some time it causes much more irritation, and is besides less efficacious. As a subconjunctival injection, it should be used fully saturated. In the same full strength, it may be freely dabbed on to the surface of a corneal ulcer with a camel's-hair brush. As a wash, it is better to use the fresh saturated solution, mixed with about twice its volume of warm water.

Boracic lotion is suitable for all cases, even where the inflammation is confined to localised infiltrations. It is the most convenient way of keeping the eye clean by removing the conjunctival secretions. It may be used saturated and mixed with some hot water, so as to bring its temperature up to that of the body. The best plan is to trickle it into the eye, squeezed out of a pledget of absorbent cotton-wool, which is thrown away after it has been used. The patient may do this fairly well himself, by throwing back his head, and holding down the lower lid with the one hand.

Tincture of iodine is only called for in the severer cases of ulceration. It is applied directly to the ulcer with a camel's-hair brush. It is a fairly good substitute for the actual cautery, when that is not at hand. In some cases its application may be preceded by scraping the ulcer, which, under cocaine, can be done painlessly. In less severe, more superficial, and especially vascularised ulcers, which are not of strumous origin, the iodine may be used as an ointment. A convenient form is as a 1 per cent. solution of pure iodine, in purified white vaseline. This should be rubbed on to the everted conjunctival surfaces with the point of the finger, and the lids then allowed to close over it. It produces only slight irritation as a general rule. For strumous superficial vascularised ulcers, the yellow oxide of mercury has already been referred to as the most efficacious application.

Nitrate of silver in solution is a very useful agent in all cases of superficial non-vascularised ulcerations. It is particularly to be recommended in ulcers of this kind, in which the base of the ulcer is more or less markedly infiltrated, but which the absence of pus in the anterior chamber (hypopyon), and more especially of any deep purulent infiltration of the margins, show to be not of the most dangerous septic order. Catarrhal ulcers in old people, to which reference has already been made, are especially benefited by one or two applications directly to their surface of a 2 per cent. solution. It is well to remember that it is inadvisable to repeat the application too frequently. The practical guide is afforded mainly by the extent to which the use of the caustic solution has relieved the pain. If, the next day after its application, the pain is found to be much less, it should not be used again. A careful examination of the ulcer will then reveal indications of healing. The rough, ragged margins have become more or less rounded, owing to epithelial growth. One's object is merely to induce healing, and further applications only destroy the newly formed epithelium, and thus interfere with the natural process of reparation.

The actual cautery is undoubtedly the best means we possess of checking the spread of a serpiginous septic hypopyon ulcer of the cornea. Cases of this kind are very frequent, and are the principal cause of unilateral blindness. They almost invariably originate in some more or less trifling injury to the cornea, by which some portion of its epithelium is denuded, and its deeper layers inoculated with septic matter, which may be introduced, either by the body with which the injury is caused, or by microorganisms which exist at the time in the conjunctival and tear sacs. The importance of this latter connection has already been considered. In the treatment of these severe destructive corneal inflammations, much depends often upon the efficiency with which the actual cautery is applied. In some cases, however, the virulence of the process is so great that it may be impossible to check it. In such cases, the specific microbe at work is generally either the pneumococcus or the gonococcus. The two best means of applying the actual cautery are by means of the galvano- and the thermo-cautery. Provided the thermo-cautery point used is a fine one, so that its action can be properly limited, it is in every way equal to the other, and is more likely to be at hand. The cautery should be made to burn sufficiently through all the deeply infiltrated margins of the ulcer. It is by these abscess margins that the ulcer spreads, and they must be properly destroyed. The other portions of the ulcer, and there are usually some such, which do not present infiltration at the margin, may be left. By using cocaine, the little operation may be done without causing pain. It is best to use a speculum to keep the eye open, and to fix the eye with fixation forceps. When there is much congestion, the fixation may be painful, but it enables one to limit the burning to the area of the ulcer. The indication that the process has been arrested by this proceeding is afforded by the diminution subsequently of pain, by the diminution in the amount of the hypopyon and the more satisfactory appearance of the ulcer margins. These septic ulcers are often very painful, and may for nights interfere with sleep. After efficient cauterisation, the patient is able to sleep, the hypopyon diminishes in amount, and the edges of the ulcer appear clearer, or merely, it may be, slightly charred. The subsequent treatment should consist in the use of chlorine water as a lotion, and iodoform in the manner just described. It is sometimes necessary to repeat the cauterisation. This should be done on any return of pain, if, at the same time, a little yellow point of infiltration shows itself at any point of the ulcer margin.

Should a really efficient application of these measures, repeated, it may be, once or twice, fail to arrest the process of destruction, the best plan to adopt is to open freely into the anterior chamber through the base of the ulcer. This treatment, by what is called Saemisch's section, at one time constituted one of the great advances in ocular surgery. Now that the actual cautery is used, it is comparatively seldom called for. A narrow Graefe cataract knife is entered at one side of the ulcer, passed across the anterior chamber, and brought out again at a point beyond the opposite margin, and then made to sever the whole base. In doing this operation, the part selected should, as far as possible, be made to include the margins which are most infiltrated. The moment the section is made, and the hypopyon escapes, there is a sudden hyperæmia of the iris, the vessels of which may even give way, and great, often agonising, pain experienced. This pain passes off in a few minutes, but it is as well to know that it is sure to occur.

(*To be continued.*)

THE OPERATIVE TREATMENT OF CALCULI WHICH HAVE BEEN LODGED FOR LONG PERIODS IN THE LOWER THIRD OF THE URETER.[1]

By E. Hurry Fenwick, F.R.C.S., *Surgeon to the London Hospital and to St. Peter's Hospital for Urinary Diseases, London.*

The best route for attacking stones which have become lodged for long periods in the pelvic part (lower third) of the ureter, is not yet definitely settled. Several cases have lately been recorded in which the abdominal incision for tying the common iliac artery has been followed, and, the peritoneum having been raised, the lower end of the ureter has been reached extraperitoneally (Robinson, Jordan Lloyd). There is no doubt but that this incision is of value when one has to remove the ureter in its entire length, or to extract stones which have become impacted in that canal, at the pelvic brim or *about that level*; but I question if it is not unnecessarily severe when the stone has become lodged *below the pelvic brim.*

If the stone can be detected by vaginal or rectal examination, it can be easily and safely extracted through a transverse perineal incision in the male, or by incising the roof of the vagina in the female.

The catheterising cystoscope will demonstrate any male ureter to be clear, or to be blocked with calculus, and in what section of the tube the calculus is situated; and any method of catheterising the female ureter (Simon, Pawlik, Newman, Hirst, Hamill, Kelly, Goldschmidt, Wertheim) will locate a stone impacted in a female ureter. It should therefore, I submit, be a general rule, that if the stone be found in the upper third, the ordinary lumbar incision is indicated; if at the pelvic brim, the common iliac artery incision suffices; if below the pelvic brim, the incision should be perineal or vaginal. Several instances are recorded of the vaginal route being followed in women (Emmet, Cabot, Rigney, Cotterell), but I am not aware that the value of the perineal route has as yet been advocated. One writer insists on the difficulty of treating a fistula caused by vaginal uretero-lithotomy as a reason for the employment of the large abdominal incision in the female (Robinson). I have not seen a fistula result in either sex, if the urine be sterile. I have even known an ureteral fistula, consequent upon vaginal hysterectomy, to heal spontaneously after three or four months. I believe the appearance of a fistula depends more upon the surgeon, and the condition of the urine, than upon the position of the incision employed.

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[1] Part of a clinical lecture delivered at the London Hospital, Dec. 1, 1897.

The two following examples, one from either sex, will serve to illustrate the employment of incisions which approach the pelvic part (the lower third) of the ureter from below rather than from above. The advantage of such a modified and simple incision is obvious.

Case 1.—*Fluted oxalate stone, ¼ oz. in weight, situated in lower ureter; no colics; removal through perineum.*—F. H., æt. 18, was sent to me in March 1895 by Dr. W. G. Little, of Nelson, Lancashire. The patient complained chiefly of pain in the glans penis after micturition, and occasional pains across the back. The onset symptom seems to have been the passage of blood at the end of micturition. This was eighteen months ago. The hæmaturia had recurred off and on since. There had been no venereal disease. The stream was fair; there was no frequency. The urine was 1012 in specific gravity, and contained a trace of albumin. The trouble had been variously diagnosed, the latest opinion being tuberculosis. There was no gross evidence of this disease, and the prostate was healthy and plump.

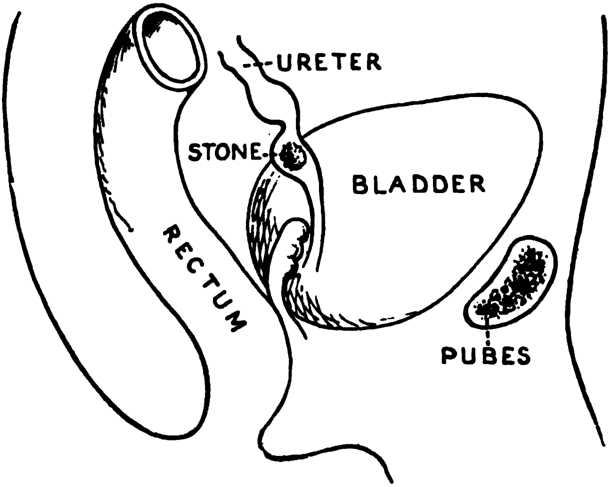

Fig. 1.

On electric cystoscopy, I discovered a prolapse of the right ureter. Crowning the everted mucous membrane was a villous tuft. It flashed across my mind that the villous papilloma played some part in the production of the prolapse, just as piles tend to evert the mucous membrane of rectum; or polypus or growth in the gut sometimes induces intussusception. I therefore did suprapubic cystotomy, and removed the prolapse and villous growth through a small caisson. On thinking over this case the same night, it suddenly struck me that the prolapse must have been due to irritation higher up the ureteral canal, for I had noted this condition in some few cases of renal calculus. I therefore returned to the patient, and passed my finger high up into the bowel. High up in the right ureter I just felt a stone the size of a large marble. It had evidently become lodged in the ureter (Fig. 1), and had as evidently induced the prolapse of the mucous membrane at its orifice.

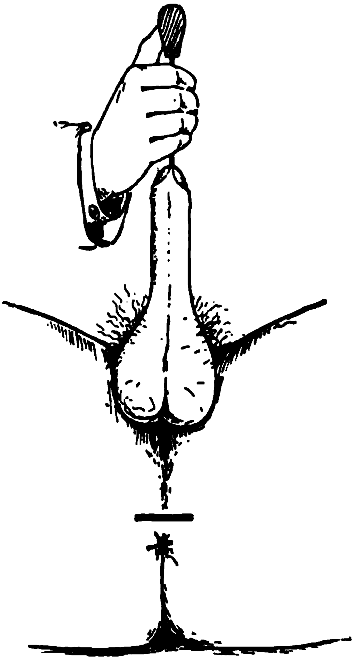

FIG. 2.

After the suprapubic had healed, I approached the stone through a small transverse perineal incision (Fig. 2). I had no hesitation in adopting this route, for it had become familiar to me in resecting pieces of vesiculæ seminales, in scooping out tubercle from the prostate, in splitting prostate capsules, in stitching vesico-rectal fistulæ, and such like operations between the gut and the bladder. With the aid of narrow, long-tongued retractors, I was able to dissect between the rectum and the lower urinary tract, every step of the route being illuminated by a Washington Isaac search-light (Fig 3) — an instrument of decided value —and by its means there was no difficulty in seeing and seizing up every bleeding vessel. I rapidly reached the ureter, being guided to it by feeling the stone in it forced within reach of my finger by the pressure of the dresser's hand upon the abdomen. A clean incision into its long axis released a quantity of clear urine, and the stone, which weighed 2½ drms. The latter resembled a small peach stone in size and appearance (Fig. 4). On inserting the finger into the ureter, it was evident that the

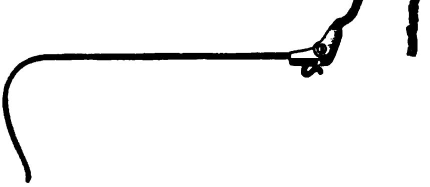

FIG. 3.

calculus had been lying in a dilatation of the canal, for the calibre was here about an inch across. I passed a thick *windowless* drain-tube up towards the kidney, and stitched its lower end into the perineal wound, providing thus for an easy route from the ureter into the perineum. The lower end was subsequently fitted to a tube dipping under carbolic lotion.

Finally, I drew off 15 oz. of clear urine, specific gravity 1012, from the bladder, thus demonstrating that the bladder had not been wounded. Next day 20 oz. had drained away by the perineal tube, and 25 oz. were removed by catheter from the bladder. Specific gravity of the latter was 1015.

There was an uninterrupted recovery. Seven days after the operation, I removed the uretero-perineal tube, judging that the pelvic connective tissue had banked in the drain sufficiently firmly to form an impermeable water-course. The fistula healed rapidly. It will, perhaps, be conceded that the deep flutings on the surface of the stone did not materially obstruct the passage of the urine, any *sudden* accumulation of urine in the renal pelvis and upper ureter was thus avoided, and renal colic was therefore not evoked.

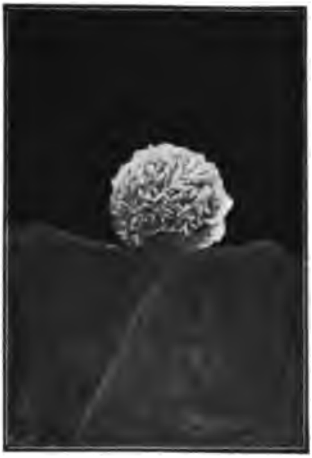

FIG. 4 (half size).

CASE 2. — *Smooth stone, weighing ½ oz., in lower ureter; severe colics; removal through the vaginal wall; cure.*—Mrs. M. H., æt. 48, was sent to me by Dr. G. Sequeira, as a case of calculus. This patient enjoyed perfect health until ten years ago, when she had a severe attack of right renal colic. For seven years these recurred at long intervals, but for the last three years they have been incessant and enfeebling. Between the severe colics which supervened every week, there was constant pain in the right loin. She was forced to sleep on the left side. Frequency of micturition was every hour, day and night; the act was painless; more urine was passed at night. Latterly bouts of excessive thirst had been experienced. On examining the lower ureter, as I now do routinely in renal cases, I found a stone in it the size of a small chestnut; it was placed to the right of the uterus, but was freely movable. There was no prolapse of the ureteral mucous membrane into the bladder.

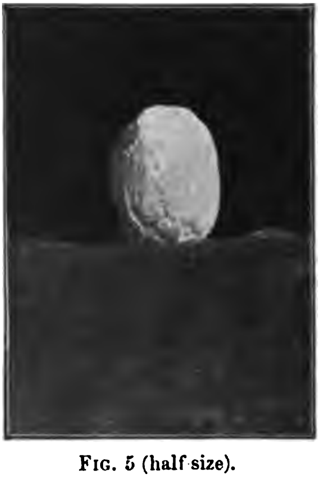

FIG. 5 (half size).

Cutting through the right wall of the vagina, I dissected towards the ureter, and fixed it and its contained stone with a sharp, very small hook, which I use for suprapubic operations. I then incised and released the stone. A large quantity of clear urine followed its removal, thus demonstrating the back pressure which had been exercised on the upper ureter and pelvis of the kidney. The stone was smooth, in size like a large nutmeg; it weighed over ½ oz. (Fig. 5). I treated this case in the same way as the preceding, pushing one end of the thick windowless drain some way up the dilated ureter, and allowing the latter end to protrude from the vagina into carbolic lotion. She made a rapid recovery, no fistula followed.

CLINICAL RECORDS.

ABNORMAL POSITION OF THE VERMIFORM APPENDIX AND INTESTINES.

By FREDERIC P. HEARDER, M.D. Edin., *Assistant Medical Officer, West Riding Asylum, Wakefield.*

THE following two cases of anomalous position of the vermiform appendix, and in one case of the large intestine also, have recently come under my notice on the post-mortem table. There was nothing to draw attention to the condition during life in the asylum, and no history of any consequent trouble previous to admission.

CASE 1.—J. H. C., male, æt. 41; a high-grade imbecile. Died eight months after admission, from acute lobar pneumonia, on the fifth day of his illness, rather suddenly. At the autopsy the pulmonary valve was incompetent to the water test, and was found to have four cusps with large fenestrations at their lateral attached borders. The right lung was in a state of red hepatisation throughout its middle and bottom lobes. There was a spleniculus. The kidneys were in a state of early chronic interstitial nephritis.

The cæcum and vermiform appendix lay in the left iliac fossa, the mesocæcum and mesocolon having a normal attachment, but being much elongated. The first portion of the ascending colon passed from the left to the right iliac fossa, thence up the right side of the abdomen, crossing normally as the transverse colon, and descended normally to the level of the crest of the left ilium, where it bent inwards at a right angle and passed horizontally across the lower lumbar vertebræ, until it reached the middle of the right iliac crest, where it bent sharply downwards and ran into the pelvis as the rectum at the right border of the sacrum.

CASE 2.—E. T., male, æt. 75; a senile dement with epilepsy. Died from general senile decay. He had fits up to the time of his death, was of costive habit, mentally quite able to complain of pain or discomfort. The autopsy showed cerebral atrophy with small softenings, fatty heart, hypostatic congestion of the lungs, and chronic interstitial nephritis. The mesentery, as a whole, was lax.

The vermiform appendix appeared (from a U-shaped bend it took there) to open into the ileum, about 1 in. from the ileo-cæcal valve, and to run thence, attached to the ascending mesocolon, well up in front of and internal to the right kidney. Its extremity for about 1 in. in extent was free, and folded on itself near the under surface of the liver. It was easily detached from the mesocolon by the help of dissecting forceps, when it was found to be continuous with the lower portion of the caput cæcum coli, joining it in a funnel-shaped manner. The cæcum being opened, and a pair of dissecting forceps inserted into the vermiform appendix and allowed to open, did so to the extent of ¾ in., at a line corresponding to the curve of the caput coli. From this line to the extremity of the appendix was a full 8 in. (21 cms.). The lumen gradually tapered to about the size of a No. 10 catheter. The walls appeared to be normal and free from any thickening or constriction. The whole length was freely opened by running along a probe-pointed bistoury, and was found to contain a little soft yellowish fæces, similar to the contents of the cæcum, there being a slight dilatation filled with the same at the free extremity.

Talamon[1] gives the length of the appendix as "extremely variable." Sappey gives 6 to 8 or 10 cms., varying from total absence to 25 or 30 cms. Fergusson gives 4½ in. as an average length.

CASES IN OBSTETRIC PRACTICE.

By J. WHEELER O'BRYEN, M.D., *Sydenham, London.*

CASE 1.—*Exencephalia and hydramnios.*—In this case the upper portion of the cranial vault is almost entirely absent, and the greater part of the brain is external. In this, the patient's fourth confinement, she had advanced to the eighth month of pregnancy when labour came on. I was sent for twelve hours after the commencement of her pains. On making a vaginal examination the membranes ruptured, and the fœtus followed almost immediately. An excessive amount of amniotic fluid was discharged, so that the bed was saturated and a stream ran on the floor. The woman attributed the abnormality to the fact that during pregnancy her observation was frequently attracted to the deformity of a child living next door; she stated that this child "looked exactly like a monkey," and quite made up her mind that her baby also would be deformed. Hence the question as to whether this might be classified as a case of so-called "maternal impression."

The deformed child referred to by my patient left the locality about a month before she was confined. I, unfortunately, have not had an opportunity of seeing it.

CASE 2. — *Hydrocephalus, spina bifida, and talipes varus.*— Hydrocephalus is fortunately a disease of comparatively rare occurrence, for, as Playfair says, "it is one of great gravity, both as regards the mother and the child."

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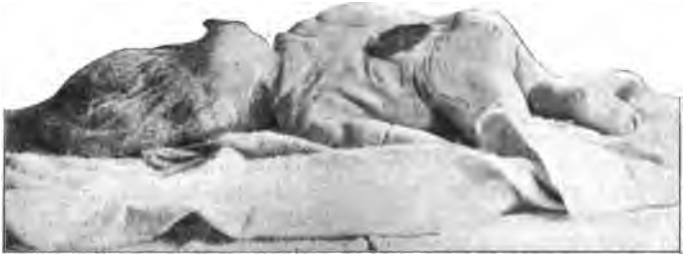
[1] "On Appendicitis," translation by R. J. A. Berry, p. 30.

Mrs. P. was in reduced circumstances, and obliged to engage a so-called midwife to attend her in this her fifth confinement. I had been her medical attendant in all the other labours, which were in every respect natural. I received an urgent summons to come to the midwife's "assistance," after the poor patient had been forty-six hours in labour. On entering the bedroom I found the nurse tugging at the trunk of the fœtus, and questioning elicited from her that she had been engaged in this way considerably over an hour; she stated that she did not see the necessity of sending for me sooner, "as it was an ordinary breech case, and everything was born except the head." I lost no time in making a most careful vaginal examination, but was unable to make out the cause of the delay, for I could only feel the comparatively firm base of the skull. There were, however, certain conditions from which I gleaned information, and my suspicion was aroused that I had a case of hydrocephalus to deal with, namely, abdominal palpation, the existence of spina bifida and talipes varus, and the history of the woman's previous labours. In a considerable number of cases—Playfair and other authors say about one in five—the fœtus presents by the breech. The patient's condition being very serious, I deemed it advisable to deliver her with the least possible delay. I did not possess a perforator, so sent a note to a neighbouring practitioner to come to my assistance and bring one at once. In the meantime the woman was rapidly getting worse. I therefore applied the forceps, and after considerable difficulty succeeded in delivering. The patient was in a critical condition up till the sixth day, with fœtid discharge, pulse averaging 120 to 140, and temperature 102° to 104°; there was no rigor. On the seventh day her condition generally was markedly improved, and from this she made an uninterrupted and most satisfactory recovery. The treatment, briefly stated, consisted of a mixture containing quinine, digitalis, and carbolic acid, washing out the uterus twice daily with creoline (1 in 100), an ice-cap to the head, and an occasional dose of antipyrin.



REVIEWS OF
BRITISH AND FOREIGN LITERATURE.

A Handbook of Midwifery. By W. R. DAKIN, M.D. London, New York, and Bombay: Longmans Green & Company. 1897.

THIS "handbook" of 629 pages of rather small print is the most important addition for some years to the list of educational works on midwifery. It may at once be stated that it contains a fairly full and clear exposition of the subject, and that in some points it has particular merits. The author has succeeded in his aim of producing what is eminently a practical book, while for the purposes of the student with examinations in view it may be safely recommended as a reliable and sufficiently comprehensive text-book.

In some parts the arrangement of the subject is strongly suggestive of the Edinburgh school, but, on the other hand, the study of frozen-section anatomy is conspicuous by its absence. The illustrations are numerous and nearly all original, and this is in itself an important matter. Many of the diagrams are exceedingly clever and of great help in elucidating the text, and it is a great relief to get away from the stock illustrations which have figured in nearly all the obstetric manuals since the days of Tyler Smith's "Midwifery."

In a more detailed criticism of the book there are many points which may be noted.

The book is divided into two main parts—Physiology and Pathology; and in each division pregnancy, labour, and the puerperal state are considered. There is no account of the structure of the female reproductive organs, and for the student this is perhaps a disadvantage. The account of the changes in the uterine mucous membrane due to the implantation of the fertilised ovum, and the description of the structure of the placenta, are rather meagre. There is no mention of the phagocytic action of the fœtal epiblast, supposed by some to occur, nor of Duval's conclusions as to the large part played by the fœtal epiblast in the formation of the placenta. For the development of the vascular sinuses the reader is referred in a footnote to a monograph, but from the description in the text one would infer that the author holds the view that they are dilated capillaries. In his description of the mechanism of labour the term "lie" is used, in addition to "presentation" and "position" of the fœtus. It is further stated that so long as the long axis of the fœtal ovoid corresponds with the axis of the parturient canal the mechanism is a normal one. Accordingly we find that face, brow, and pelvic presentations are included in the first or physiological division of the book, by which it might be inferred that these are regarded as normal presentations. They can hardly, however, be called normal, inasmuch as they all mean more risk to the mother, or to the child, or to both, than the ordinary vertex presentation. The account of the separation and expulsion of the placenta is not very clear, and the author leans to Schultze's rather than to Duncan's view. In the mechanism of labour the movements of flexion is fully described just as it was fifteen years ago, and the lever theory and the general contents pressure theory to account for the movements are both stated in full.

Exception may be taken to some of the treatment recommended in the book. Thus, in speaking of cancer of the uterus complicating pregnancy, it is stated that, "as a general rule, the best treatment before the sixth month is to empty the uterus, and then deal with the cancer in the most suitable manner." In cases in which it is possible to extirpate the cancerous uterus, it is probably better treatment, until the end of the fourth month at least, to perform vaginal hysterectomy without the previous removal of the contents of the uterus. At a later stage abdominal panhysterectomy may be fairly considered. The chapter on ectopic gestation is perhaps hardly up to date. Too little attention is paid to incomplete tubal abortion and tubal mole, considering the relative frequency of these conditions. In cases of concealed accidental hæmorrhage, it is recommended to rupture the membranes, even if the os is quite small. In severe cases, such a procedure, by taking away the counterpressure of the liquor amnii, may lead to a sudden and fatal internal hæmorrhage. In cases of placenta prævia the author seems to believe that a more extensive use of Champetier de Ribes' bag will obviate the necessity of turning. In common with many other London obstetricians, the author seems to have no great faith in axis-traction forceps. It is stated that the use of this forceps is practically confined to pulling the head through a contracted brim, but if the obstruction is so great as to render delivery by the aid of the ordinary forceps impossible then it is better to turn.

In severe post-partum hæmorrhage it is recommended to plug the uterus, when other methods, such as compression and the hot intra-uterine douche, have been tried without success.

The pathology of the puerperal state is very well written; and we may notice, as an instance of the good clinical judgment of the author, the description of the rise of temperature, caused entirely by constipation, which sometimes occurs about the ninth day in lying-in women.

In spite of minor defects, the book is a good one, and we can safely recommend it both to students and practitioners.

Archibald Donald.

Mediterranean, Malta, or Undulant Fever. By M. Louis Hughes, Surgeon-Captain, Army Medical Staff. London: Macmillan & Co. Limited. 1897.

The author's object, as he informs us, in writing this book was to place the knowledge of Malta fever, which he had acquired during a residence of six years in the island, at the service of his successors, in order that they should not have to go over the whole field anew, but be able to take up the investigation of the disease where he was compelled to leave it. The work, we think, will prove useful to a wider circle than that for which it was primarily intended. Malta fever, or, as Dr. Hughes prefers to call it, undulant fever, is not restricted to the shores and islands of the Mediterranean. Evidence is accumulating that it is met with, although to what extent is still uncertain, in India, China, and other parts of the East. In its milder forms it appears to have been hitherto mistaken for common continued, and in its more severe types for malarial or enteric fever. This confusion should no longer exist. Dr. Hughes' work will be of service in familiarising the practitioner with the positive methods by which it can be distinguished, on the one hand, from the fevers caused by Laveran's plasmodium, Eberth's bacillus, and Obermeier's spirillum; and, on the other, from the undifferentiated residue of tropical fevers, the nature of which is still obscure. Professor Wright's discovery, that the serum of persons recently attacked with the fever has an agglomerating effect on pure cultures of the *Micrococcus melitensis*, will prove of vast importance as a means of diagnosis. It would have been well if Dr. Hughes had described somewhat more in detail the method of applying the test with dead cultivations, for this is really the only one available in the case of those living remote from large cities and destitute of special bacteriological apparatus and training.

The chapter on the bacteriology of the disease leaves nothing to be desired, either as regards fulness of detail or lucidity of description. The author has repeated and confirmed the inoculation experiments of Bruce. The temperature chart of a fever of ninety-nine days' duration, in a monkey inoculated with the micrococcus, is so absolutely identical in its successive fluctuations with the typical march of the temperature of the human subject, that a glance at it will carry conviction to the most sceptical, that we have, in the micrococcus of Bruce, the pathogenic agent of the fever.

Malta fever is eminently a disease dependent on local conditions. Case after case is sent to hospital from the same barracks, house, or even room. All who have had experience of the malady agree in ascribing it to neglect of sanitation. The result of Dr. Hughes' inspection of fever-haunted houses was in every instance the same. The breathing air of the dwelling or bedroom was found demonstrably polluted by emanations from cesspits, untrapped water-closets, or obstructed drains. In no case was the infection traced to contaminated milk or water.

It is rather remarkable that the men belonging to ships of war lying in malodorous, tideless Mediterranean harbours are more liable to contract Malta fever than the soldiers and others on shore, and it would appear that those who remain on board, without landing, do not escape. The men exposed to the emanations from the fœtid mud of the docks suffer most. Dr. Hughes finds some difficulty in accounting for the prevalence of the disease in these circumstances, seeing that germs do not rise spontaneously from moist surfaces, and that even strong air currents are unable to detach them. This is true, but the statement must be accepted with qualifications. Corre found the air in the marshy regions of Rio Nunez and Boké, in Senegal, to be rich in organisms proper to and derived from the marshes. Wherever putrefactive gases are disengaged from water or moist surfaces, there organisms will be detached and find their way into the air.

Three clinical types—the malignant, the undulatory, and the intermittent—are recognised and described. The principal symptoms and complications are analysed individually, and the varying aspects of the disease illustrated by select cases and temperature charts.

We are glad to see that the author has devoted special attention to prophylaxis and treatment. The disease, it is true, is not a fatal one, but it is one of the most debilitating and painful, and out of sight the most protracted of all acute infectious fevers. The duration of the pyrexial period averages about seventy days, and has sometimes been known to last for three hundred days, while the period for invaliding not infrequently extends over a year and, in exceptional cases, to two years. It is not, therefore, a disease to be treated on the expectant system. For although, as Dr. Hughes remarks, many cases do well with careful nursing and dieting, experience has proved that the mortality may be reduced, the complications rendered less frequent and severe, and the duration of the fever shortened, by appropriate medical treatment. The value of the different remedies and the indications for their employment are discussed in the light of the author's professional and personal experience of the malady.

The bibliography of Malta fever is already a somewhat formidable one, but most of the original observations are scattered through innumerable periodicals and text-books, not readily accessible by those who most want them. It has been reserved for Dr. Hughes to furnish the first systematic treatise on the subject, bringing together within reasonable compass everything of value on the literature of the subject. The work is in every respect an admirable one, and may be profitably consulted by all who are scientifically or practically interested in the subject. A. DAVIDSON.

The Student's Guide to Medical Diagnosis. By SAMUEL FENWICK, M.D., and W. SOLTAU FENWICK, M.D., B.S.Lond., M.R.C.P. London: J. & A. Churchill. 1897.

FEW books of this kind survive to an eighth edition, or see the twenty-eighth year after the first edition appeared, mainly because the writers either allow themselves to drop behind the most recent methods of teaching, or lose touch with student wants; but the authors have in this case extensively revised, added to, and greatly improved an already justly popular book.

The pathology is brought up to date, and much stress is laid upon the importance of understanding the alterations in structure and function of diseased organs before studying the symptoms and signs produced. One feature of the book is the number of groups of diseases contrasted in tabular form. These are most useful to the student, though in contrasting the symptoms and physical signs of hypertrophy, dilatation, valvular disease, fatty heart, and angina pectoris, a good deal of confusion may be caused in the mind of the student reader, from the frequency with which these conditions are found in combination in one patient. Many of the diagrams and illustrations are new, and greatly add to the value of the book; and the index, if short, is comprehensive and practical.

ROBERT A. FLEMING.

Diseases of the Eye. By E. NETTLESHIP. Sixth edition. Revised and edited by W. T. Holmes Spicer, F.R.C.S. London: J. &. A. Churchill. 1897.

NETTLESHIP'S "Diseases of the Eye" has now been a well-known and much appreciated handbook since the first edition appeared in 1879. On this occasion certain additions and improvements, too, have been introduced by Mr. Holmes Spicer. The book has been brought up to date in every particular, with perhaps the exception that no mention is made of the use of Röntgen rays as an aid to diagnosis. In such a text-book, intended primarily for students, it is difficult to avoid a tendency to the laying down of hard-and-fast laws, the necessity for which is not made clear to the reader, and this error, if error it be, has not been altogether avoided; and while it is not desirable or judicious to discuss moot points in a manual, still the fact that there are views on a given topic other than those held by the author, and just as worthy of credence, might a little more frequently be indicated. It is unwise to set puzzles before the reader, who is presumably a tyro, but it is not quite fair to him to let him rise from the perusal of such a work with the idea that we have nothing more left to learn, that there are no more mists to be cleared up, and that there is no way but one (that of the writer) of acting in certain circumstances. On certain topics, too, for example "Anisometropia and its Treatment," and "Nystagmus," the information and guidance are decidedly meagre. The plan pursued in devoting a section (3) to "Diseases of the Eye in relation to General Diseases" is an excellent one, and is well devised and carried out, even if it be a little sketchy. On the whole, there is no better text-book of its size on the subject of diseases of the eye than this.

W. G. SYM.

Twentieth Century Practice of Medicine. Vols. x. and xi.—*Diseases of the Nervous System.* London: Sampson Low, Marston, & Co. 1897.

Two large volumes, of over eight hundred and nine hundred pages respectively, are given to the consideration of the subject of nervous diseases, in this encyclopædic work. It is impossible in a short review to do more than refer in the briefest manner to the special articles or to their authors, all of whom are recognised authorities upon the subjects of which they treat, in their several countries. In the tenth volume there are described cerebral localisation, and the organic diseases of the brain and its membranes, hysteria, epilepsy, the neuroses, neurasthenia, and the disorders of sleep and speech. In the eleventh volume the articles are upon diseases of the cerebro-spinal and sympathetic nerves, tropho-neuroses, diseases of the spinal cord, and pain.

The first chapter, which will undoubtedly attract the attention of neurologists, is on cerebral localisation, and from the pen of Dr. Joseph Collins of New York. This subject is treated in a terse and concise form, and may on the whole be taken as a representation of the views now held upon this matter. But there is one statement to which we would take exception, namely, that it matters little what the nature of the lesion is, its location is all-important. We would be inclined to state that in clinical medicine the nature of the lesion is of prime importance, while its location is subsidiary. It is a matter of regret that the enthusiasm with which cerebral localisation was, and continues to be, received has tended to displace the importance of this factor in diagnosis. Valuable articles by the same author are found upon encephalitis, infantile cerebral palsies, thrombosis of the dural sinuses, and others.

Dr. Dana has contributed a short but well-arranged chapter upon cerebral apoplexy and hemiplegia; and also has written the chapter on neurasthenia. In the article upon tumours of the brain by Dr. Sachs, the chief interest lies in his philosophic discussion of the value of operative procedure. During the past few years many valuable papers have been written on this subject, both in Europe and America; hence it would be interesting to know what opinion Dr. Sachs is prepared to state in this connection. He says: "My own experience has taught me that, even at the risk of a possible mistake in diagnosis, a trephining operation in the earliest period of the disease may be entirely justifiable. . . . Much good may come from surgical practice and little harm, while the practice of deferring surgical interference until other measures have proved fruitless, implies, or means, the loss of valuable time." This would seem to be the now almost universally recognised doctrine—operate as early as possible; but the difficulty lies, not in the operation, but in the localisation of the new growth to a position from which it may be removed.

The three important chapters on epilepsy, spasmodic neuroses, and hysteria have been contributed by Dr. Ch. Féré of Paris. It need hardly be said that they are amongst the most instructive in the volume. In the article on epilepsy, in particular, much valuable information is conveyed in a highly interesting manner; and more especially upon the mental characteristics and attitude of epileptic persons.

We are, however, of opinion that the consideration of partial or focal epilepsy has not received the attention which it undoubtedly merits.

Of the eleventh volume, the first half is given over to a long and detailed article, by Dr. Lloyd of Philadelphia, upon diseases of the cerebrospinal and sympathetic nerves. Here is set forth in detail the symptoms, diagnosis, and treatment of a large number of affections arising from disease of the peripheral nervous system. Included in it are the latest facts upon nervous anatomy, which the laborious investigations of Golgi and his school have demonstrated. We would especially refer to the chapter on multiple neuritis as being one of the most fascinating in the volume; for, in addition to a short history of the discovery of the disease, the reader is given a most comprehensive and philosophical account of this affection in all its varieties.

The subject of trophoneuroses, under which title are included such conditions as facial hemiatrophy, Raynaud's disease, scleroderma, and acromegaly, has been treated in two articles by Drs. C. K. Mills and F. X. Dercum.

Injuries and diseases of the spinal cord, with the exception of tabes dorsalis and the combined scleroses, which have been handled separately by Möbius and Strümpell, have fallen to the lot of Drs. Bruns and Windscheid. The several conditions embraced in this chapter are discussed with characteristic thoroughness and attention to detail; but we would more especially point to the chapter on tumours of the spinal column and spinal meninges, as worthy of special attention and consideration. The volume concludes with a short account of pain, chiefly from the psychological standpoint, from the pen of Witmer of Philadelphia.

In conclusion, we would say the several articles are accompanied by full bibliographical records, and that the references are well up to date. There is, however, a want of uniformity in this matter; in some articles a number annexed to the name in the text indicates the exact work in the bibliography to which reference is made; while in others it is left to be inferred that the bibliographical reference is that mentioned in the text. We consider that these two volumes give the reader a sound idea of the present state of neurological thought and practice.

WILLIAM ALDREN TURNER.

Psychiatrie, ein Lehrbuch für Studirende und Aertze. Von DR. EMIL KRAEPELIN. 5th Edition. Leipzig: J. A. Barth. 1896.

THIS volume, which extends to over eight hundred closely-printed pages, is a magnificent monument of a lifelong devotion to his speciality, by a man whose mind-grasp is sufficiently broad and philosophical to comprehend, without prejudice or crotchet, the whole field of medical psychology. He also possesses the gift of presenting his views with a lucidity that appeals to his readers, and compels, if not acquiescence, yet respectful attention, even though he uproots and casts aside views and opinions that have been held in veneration from the time of Hippocrates until the present day. It is true that here and there the author dogmatically expresses doctrines which in our present state of knowledge are quite untenable, and that he takes for granted many facts which, however probable, and however serviceable and secure as hypotheses and theories, are yet not sustained by up-to-date investigations in physiology and pathology. For this there is every excuse; where Kraepelin has sinned is not by anticipating the demonstration of such conditions as auto-intoxication, and nutritive changes of a toxic character (Stoffwechselerkrankungen), about the existence of which there can be no rational doubt, but in building upon these conditions part of his classification of mental affections.

Under the heading Disorders of Nutrition he not only classifies the insanity of myxœdema and cretinism, both of which are legitimate, but also general paralysis, and a division called Developmental Affections, including dementia præcox, katatonia, and what he is pleased to call "dementia paranoides." It is safe to state that whatever surprises pathology may yet have in store for us, neither the class of developmental insanities just mentioned, nor general paralysis, can, at present, without a severe infringement of the ordinary standards of scientific assumption, be classified in this manner.

The introduction, consisting of only eleven pages, is a masterpiece of condensation, and contains a survey of the progress made in the methods of treating the insane, from early historical times down to the present day. It points out that the recognition of the physical origin of mental diseases, commonly held by the physicians of Greece and Rome, was destroyed by the scholasticism and superstition of the Middle Ages, and proceeds to describe the re-establishment of these views within the past century. How great and marked has been the advance, no one who has at all observed the subject can deny. The keynote of the introduction is that we must not rest satisfied with these merely material attainments, but must proceed further with the pathological and clinical study of mental diseases, and especially on the clinical study does the author lay particular stress.

Our first great duty as physicians is the presentation of a prognosis. It is a more immediate duty than either pathology or therapeutics, and our knowledge of prognosis can only be obtained by minute clinical observation. On this point Kraepelin puts particular emphasis.

The author fully discusses the etiology of insanity, and, as might be expected, he lays small stress upon the many external so-called causes. Etiology is divided into (*a*) external influences, and (*b*) internal influences. The subdivisions of the former, which form the most interesting as well as the most advanced portion of this section, are—(1) Bodily affections, brain lesions, nerve lesions, infections, poisons, disorders of metabolism, diseases of the organs of special sensation; and (2) psychical influences, among which are included the usual list of emotions and mental strains to which the human mind is subject.

The manifestations and symptoms of mental diseases present nothing noteworthy, and do not offer any fresh views upon this somewhat uninteresting subject.

Kraepelin, as is well known, is one of the most accomplished experimental physiological psychologists of the present day, yet in the present work he is significantly and perhaps wisely silent on that subject. However much we may be indebted to experimental psychology for facts of the most vital importance, it has no more right to a place in a textbook on mental diseases than physiology has in a treatise on clinical medicine.

The third division of the book deals with the commencement, course, and termination of mental diseases, and the fourth division with their diagnoses. While of great value, and endowed with the author's vigorous originality, they possess no special interest to the general practitioner. The following is his dictum on opium, and the vexed question of its use in mental therapeutics:—"From the earliest times opium has been used in the treatment of mental maladies. It acts by paralysing certain functions of the cerebrum, and also, it would appear, by diminishing the blood nutrition of the same. A more complete knowledge of its influence on the various psychical processes is unfortunately, up to the present time, awanting."

The most important part of the work, and the one that specially characterises it, is the section dealing with what the author calls "Constitutional Mental Disturbances." This section alone is sufficient to stamp the book as marking an epoch in psychiatric literature.

The first division of the constitutional insanities is termed "Periodical Insanity." The following quotation is sufficiently explicit of the author's meaning, and will go far to justify the new departure which he has so boldly and suddenly taken in classification.

"By periodical insanity we mean those mental disturbances which recur several times in the life of an individual, and which arise without any apparent outward cause. Such attacks are distinguishable from those relapses which in convalescents produce more or less intense exacerbation of the diminishing symptoms of the disease, as well as from many forms of insanity which are produced by identical occasional causes, such as alcoholic delirium.

"The periodical attacks may often be observed to recur at regular intervals, and there are certain forms, the subsequent attacks of which one is able to predict with absolute certainty. Evidently, in such instances, the disease is induced solely through periodical revolutions within the organism, which recur with the same regularity as sleep, menstruation, or epileptic fits.

"These several outbreaks are not independent illnesses, but are manifestations of a continuous morbid process, which gradually leads up to the attack.

"In the intervals between the attacks the patients cannot be considered mentally healthy, as may be proved by the presence of various morbid peculiarities.

"On the other hand, the intervals between the attacks may be irregular. The reason for this is to be found in the fact that the organism at certain times is less able to resist external and internal influences which assail it.

"Between the ages of 15 and 25, as well as later between the ages of 45 and 50, the attacks are most numerous and the intervals shorter and less frequent. Certain physiological crises, such as childbirth and other outward detrimental factors, may combine to predispose the individual to the attacks.

"These facts help to make it clear to us how a mental disturbance may only be manifested once or twice in the course of a lifetime without any sufficient outward recognisable cause.

"It cannot, we think, be denied that a really periodic mental affection may only reach its climax (a single attack) once in an individual life. We meet with cases of undoubted epilepsy, in which the more marked symptoms may only be manifested once or twice during a lifetime. Here, as in periodic mental affections, the clinical peculiarities of the disease are the only sure means of diagnosis.

"The extraordinary number of cases of insanity which are periodic in their manifestation have made us very familiar with the features of this group, and the more clearly we understand the peculiar features of periodic mental affections, the more will the above conclusions come to be relied upon.

"In this way some very great difficulties have been overcome. I have at any rate been able, with almost absolute certainty, to diagnose periodicity from simple observation of the clinical manifestations of the cases.

"Perhaps, in the present state of our knowledge, it will be best to classify the clinical forms of periodic insanity into three divisions, namely, (1) the maniacal form, (2) the circular form, (3) the depressive form."

In this way Kraepelin disposes of mania and melancholia, hitherto regarded as elemental and complete forms in themselves. There is no other description given of them except as symptomatic forms of senile insanity.

An English translation is much to be desired, and I understand that one is now in course of preparation in America.

John Macpherson.

The Dwelling-House. By George Vivian Poore, M.D., F.R.C.P. London: Longmans, Green and Co. 1897.

In this small book Dr. Poore gives more sound and convincing teaching on subjects connected with health than many more pretentious volumes, and this largely for the reason that every page shows that he has thought out for himself the problems which he discusses. It is possible not to agree with all his contentions, but we think it is quite impossible to read his book without profit, or to close it without feeling that in writing it he has done valuable service to the cause of hygiene.

He objects to houses of great height, and this chiefly because of the overcrowding on area, and the prevention of sufficient sunlight entering rooms, and protests against architects following such models (necessary perhaps in great centres of industry) when asked to plan houses in the country. He insists, and we think with good reason, that the Model By-Laws issued by the Local Government Board of England are quite inapplicable to rural and growing districts. For country places he thinks that the height of a house should in no case be greater than the breadth of the street, and that the house should have a minimum private curtilage, entirely free from buildings, equal to the cubical contents divided by 50. A four-storeyed house, covering an area of 50 feet by 50 feet, and 50 feet high, must have a minimum space of 1000 square feet for its backyard. The adoption of such a rule would certainly encourage the building of one- or two-storey houses. Considering that the present methods of sewerage and water supply facilitate overcrowding, he treats these subjects at some length. Water carriage of sewage he considers a wasteful, dangerous, and extravagant method for such districts, and recommends the dry method of removal. The solid fæcal matter should be dug into the soil about a foot or less from the surface, and the urine either sent away in the slop water, or passed directly into some absorbent matter, *e.g.* sawdust or peat. The power of the "living *humus*," *i.e.* the superficial foot or so of the soil, to retain and render innocuous and serviceable the organic refuse matter placed there, he has long insisted on. In a five-foot deep experimental well, with impermeable walls, and situated in the centre of a garden heavily manured with human excreta, he found the water organically pure, with only 7·5 microbes per c.c., and no *Bacillus coli communis*. This is very interesting, and quite coincides with the observations elsewhere of the reviewer, but will hardly lead many to be "not altogether sure that a properly constructed surface well in a selected situation may not prove to be one of the safest sources for water."

We heartily recommend this book to every one interested in rural sanitation. C. HUNTER STEWART.

Anleitung zur Aseptischen Geburtshülfe. Von Dr. PAUL STRASSMANN. Berlin: Verlag von S. Karger. 1897.

THIS brochure of 162 pages, in the painstaking and elaborate style which is characteristic of German writings, is an account of the latest stage accomplished in obstetric progress. Aseptic midwifery succeeds to antiseptic midwifery, as aseptic surgery to antiseptic surgery. The gain in results from this method, when conscientiously carried out, is clear; but asepsis is an elusive ideal, and its elaborate and complicated details are quite impracticable in the homes of the poor, where the greatest risks must always be encountered. But in lying-in hospitals, and in the homes of the well-to-do, there is no doubt that aseptic midwifery can, and should be practised. We recommend especially to our readers a careful study of the chapter on the management of labour by external examination only. In this particular we have much to learn in Great Britain. Leopold of Dresden has published an account of 1000 cases conducted by external examination only, and there is no doubt that by this method an important source of possible infection is eliminated. The details of the aseptic management of the puerperium are almost equally important, and are discussed by the author with great minuteness. Altogether this is a valuable and important work.

T. W. EDEN.

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1. *Neuropathologie und Gynækologie.* Von Dr. FRANZ WINDSCHEID.
2. *Ueber Puerperale Psychosen.* Von Dr. OSWALD KNAUER. Berlin: Verlag von S. Karger. 1897.

THESE two short treatises are important contributions by neurologists to a department in which there is great need for fresh clinical and pathological observation. The former is a very careful compilation, and sets forth all that is known about such conditions as chorea gravidarum, hyperemesis gravidarum, and puerperal paralyses. The latter contains a record of over seventy cases of mental disorders, occurring in the puerperium, which came under the author's personal observation in the Kahlbaum Institute at Görlitz. The cases are well told, and Dr. Knauer is full of information and suggestion about their management.

T. W. EDEN.

The Essentials of Experimental Physiology. By T. G. BRODIE, M.D., Lecturer on Physiology, St. Thomas's Hospital Medical School. London: Longmans, Green & Co. 1898.

WITHIN the last year a number of books dealing with the subject of experimental physiology have appeared in this country, one of them being a translation of Biedermann's "Elektrophysiologie" (vol. i.), the others mainly in the form of exercises in practical physiological work.

The latest addition to this class is a most excellent small text-book by Dr. Brodie of St. Thomas's Hospital, and is perhaps, on the whole, the best of the smaller books that we at present possess. It is clearly written, and the directions for the successful working out of the experiments is more fully given than in any of the others. One excellent feature of the book is the inclusion of a series of records of tracings.

The author starts with a commendably clear description of batteries, keys, commutators, induction coils, etc. He then passes on to the dissection of nerve-muscle preparations, and the graphic method of studying muscular contraction. Methods for taking isometric and isotonic curves, and the effects of different agents upon these, are described in the clearest fashion.

The chapters which follow deal with the summation of muscular contractions, the genesis of tetanus, muscle fatigue, and muscle thickening. Muscle sound is not taken up. Passing over the chapter on independent muscular excitability, and the effects of the constant current on muscle, we come to a very interesting chapter on the determination of the functions of nerve. It might have gained in clearness by the introduction of a little more detail. This is especially true regarding electrotonus, although Dr. Brodie is one of the very few who emphasise the changes in conductivity in the nerve in the electrotonic state, a subject which was worked at many years ago by v. Bezold and Rutherford.

The chapters on the examination of the frog's heart, the recording of the heart-beat, the action of heat upon the latter, and the functions of the nerves of the frog's heart, keep up to the high level of the previous chapters. The same holds of the short chapters on the action of drugs on the frog's heart, the plethysmographic method of registering the excised heart's activity, and so on. In the chapter on muscle currents, Dr. Brodie follows Hermann in regarding the resting normal muscle as isoelectric. The later sections deal with the circulation, blood pressure, and on kidney tracings with the oncometer and oncograph, this latter part being a novelty in a text-book of this description. The part dealing with demonstrations of the nervous regulation of respiration and that on the secretion of saliva are short but succinctly described. The chapter on the physiology of the eye is rather short to be useful. But this book deserves nothing but praise.

In an age when smaller text-books tend to become mere disconnected extracts from larger works, such an honestly written book stands out as an example worthy of imitation. It will be found especially useful for the student reading for higher examinations.

T. H. MILROY.

RECENT ADVANCES IN MEDICAL SCIENCE.

MEDICINE.

UNDER THE CHARGE OF

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Rheumatism.

Acute rheumatism.—Achalme described in 1891 an anærobic organism, cultivated from the brain of a patient who died from cerebral rheumatism. Thiroloix (*Gaz. hebd. de méd.*, Paris, 3rd October 1897), in a paper read to the Society of Biology in Paris, announced that he had cultivated an organism, identical with that previously discovered by Achalme, from the venous blood of three patients suffering from acute rheumatism. The identity of the two, however, appears not to be an absolute certainty. One or two minor differences could be detected between their modes of growth and between the characters of their products. A previous paper by Thiroloix was read in March of last year, and the paper at present alluded to refers more particularly to the third case of visceral rheumatism which he has investigated. The attack appeared at the commencement to be of the usual nature, and quickly reacted to the influence of salicylates. Ten days after the fall of the temperature, recrudescence occurred, with joint lesions, high temperature, pericarditis, double pleurisy, and intense congestion of the lungs. These symptoms resolved anew under the use of salicylates, but the patient when he left hospital presented the signs of cardiac disease. Cultivations made from the blood and from the pleuritic fluid at the height of the attacks yielded organisms which were able to grow in milk, but only under the anærobic conditions. Broth cultures under the same conditions showed a much smaller number of colonies. These bacteria proved fatal to guinea-pigs. A further description of the symptoms presented by the animals inoculated from the colonies appertains rather to pathology than to medicine. It may be noted, notwithstanding, that rabbits developed pulmonary congestion and pleurisy with effusion after inoculation, while their joints were never affected, unless the organisms were actually injected into them. Still more interesting is the fact that endocarditis of the mitral and tricuspid valves of the heart almost invariably occurred as a result of the inoculation. Achalme (*Ann. de l'Inst. Pasteur*, Paris, 1st November 1897, p. 845), investigating the action of salicylate of soda upon this organism, obtained a remarkable result, the salicylate arresting the bacterial growth, although it possesses little or no effect on the majority of micro-organisms hitherto subjected to its action.

Geos, in a monograph on rheumatism, gout, and allied affections, claims that acute rheumatism is always due to a specific micro-organism. He lays much stress upon the careful estimation of the amount of uric acid present, and recommends the use of salicylates and colchicin.

In the *Indépendence médicale* for 24th November, Triboulet and Coyon found, or rather obtained, an anærobic organism, apparently similar to the one described by Thiroloix. The patient was a child suffering from acute articular rheumatism, with endocarditis, pericarditis, and chorea. It is interesting to note that inoculations from a segment of the spinal cord afforded pure cultures of the organism, and the authors suggest that the choreic movements might well have been due to the growth of the organism in the spinal cord. Singer, in a paper upon the endocarditis commonly occurring during attacks of acute rheumatism (*Wien. klin. Rundschau*, 1897, No. 39), accepts the theory that the joint affections accompanying acute rheumatism are caused by a bacterial toxin circulating in the blood. He looks upon the tonsils as the commonest site of primary absorption or infection by the organisms involved. The disease, to his mind, is rather a pyæmia than an infection by any single organism. Endocarditis generally follows the inflammation of the joints, in some cases precedes it; in either case the primary lesion is frequently tonsillitis. The organisms of pus have often been obtained from a heart affected by endocarditis, and also, as the author shows, in the affected joints, and he is inclined to think that they must have some influence on the causation of the disease. Risse (*Deutsche med. Wchnschr.*, Leipzig, 1897, No. 15) relates a case supporting the conclusion of Laquer, that rheumatoid affections of the muscles may be caused by the weakened virus of acute articular rheumatism. In his case he found evidence which seems to prove that an acute polymyositis may be directly connected with acute rheumatism, and may probably arise from a common infection. All the symptoms of polymyositis acuta were exhibited by his patient, and he suggests that many of such cases, lately described, really were sequelæ of acute rheumatism, or arose from a similar infection.

Jaccoud (*Journ. de méd. de Paris*, April 1897) points out in a clinical lecture that commonly some antecedent local process can be discovered on inquiry into the history of the attacks, which is or has been present in acute rheumatism. Of these by far the most important is tonsillitis, and the organisms found in these structures are very similar to those common in the other affected tissues. Any lesion may suffice to allow of the entrance of the rheumatic poison; a wound of the foot has been asserted in one instance to have been the primary seat of infection. It is practically certain, although not definitely proved, that acute rheumatism is of bacterial origin. Jaccoud records a case in which a child born while the mother was suffering from a severe attack of acute rheumatism, developed twelve hours afterwards all the classical symptoms of the disease. Treatment with salicylate of sodium caused the disappearance of the symptoms in a few days.

A case of sudden death during a first attack of acute rheumatism in a girl of 16 was communicated very recently to the Clinical Society of London by Herringham (*Med. Press and Circ.*, London, 2nd February 1898). Admitted on the second day of the attack with a temperature of 103°, a pulse of 128, respirations 32, multiple joint lesions and a double apical murmur, but with no cardiac enlargement, the patient soon experienced relief from the pains in the joints under sodii salicylas. Epigastric and precordial pain persisted, however; the heart enlarged; diminished resonance over the left lung appeared, with respirations 64; the fever continued; and fourteen days after the beginning of the attack sudden death supervened. The autopsy demonstrated double pulmonary œdema and fatty degeneration of the acutely inflamed walls of the left ventricle. Acute myocarditis, as present in this case, is probably the usual cause of the infrequent fatal termination of acute rheumatism. Its diagnosis is uncertain, but may be suspected if the patient becomes cyanosed to a greater degree than the physical signs in the lungs show cause for, and if there be much pain in the epigastric or precordial regions. In the discussion of the paper, Maclagan pointed out the importance of recognising myocarditis as a dangerous complication of rheumatic fever, and stated that he discarded the use of salicylates whenever suspicious of the heart's muscle, preferring to use salicin. Lees suggested that many of the symptoms described were connected rather with the rheumatic poison than with the actual myocarditis, or with the salicylates. Sir Dyce Duckworth looked upon the myocarditis—its presence was not sufficiently appreciated—as due to the rheumatic poison, and best treated by iodide of potassium and brandy, or if with salicylates by giving brandy with them. The complication could sometimes be averted by suitable tonic treatment, sometimes nothing affected its fatal course.

Subacute rheumatism.—Blech (*Journ. Am. Med. Assoc.*, Chicago, 1897, p. 723) is of opinion that many cases of subacute or chronic rheumatism are not preceded by former attacks of the acute disease. He looks upon gonorrhœal rheumatism as a perfectly distinct disease, unconnected with ordinary rheumatism. The treatment for the chronic or subacute rheumatism—he classes the two together—should consist, not in drugs, but in general measures. He has seldom found salicylates to be of any use, nor has electricity in his hands proved of service. He has most confidence in the use of hygienic and dietetic measures, but especially in the local application of hot-air baths. He suffered from the disease himself, but obtained relief, after many other measures had failed, from the application of hot air, and gives details of seven other cases in which the same method of treatment proved exceedingly efficacious. He gave them no drug, recommended no massage, the only addition to the baths consisting in the rubbing of a little vaseline into the affected limbs.

Rheumatoid arthritis.—The conclusions which end a paper by Barjon (*Gaz. d. hôp.*, Paris, 28th August 1897) upon this disease, may be summarised as follows:—

1. In both acute rheumatism and those cases of false rheumatism

which are caused by poisons resulting from the pathological processes in scarlet fever, tuberculosis, diphtheria, or gonorrhœa, the disease may be developed from debility of the system, from predisposition, or from heredity, combined with various pathogenic influences. In no case does it seem to originate from primary lesions of the nerve centres.

2. Chronic rheumatism arising from any of these causes always presents three definite periods—(*a*) articular, (*b*) neurotrophic, and (*c*) myelopathic—which are always associated at each stage with corresponding physical lesions of the bony framework of the body.

3. The classification of acute rheumatism and cases of false rheumatism, or pseudo-rheumatism as he calls it, can only be regarded as temporary, and will be altered when the causes of all the rheumatic processes have been more correctly determined.

4. The X-rays may become of the greatest service in the differentiation between chronic rheumatic conditions and the deformities caused by gout or nervous diseases.

Riesman (*Univ. Med. Mag.*, Philadelphia, October 1897), discussing this subject, states that he prefers the name arthritis deformans to the name rheumatoid arthritis. He looks upon Heberden's nodes as due to this disease, rather than to gout. Of the four theories which have been advanced as to the causation of rheumatoid arthritis, namely—(1) it is a form of chronic rheumatism, (2) a mixture of inherited rheumatism and gout, (3) of nervous origin, (4) or caused by a specific germ—he prefers to look upon the third as the most likely etiological factor.

At a discussion which took place at the meeting of the British Medical Association of last year, upon the relationship between rheumatoid arthritis and diseases of the nervous system, tuberculosis and rheumatism, Stewart, who opened the subject, stated that rheumatoid arthritis was a disease which generally occurred in people of a rheumatic tendency, and who had previously suffered from attacks of subacute rheumatism. All depressing influences and the presence of infectious diseases increase the tendency. He was unable to discover any sharp dividing line between chronic rheumatism and early rheumatoid arthritis; while the theory that the latter was due to nervous disturbances had not so far been supported by sufficient evidence. He was rather inclined to favour a bacterial origin. In the discussion which followed, so many various views were enunciated that profitable abstraction is rendered impossible.

SURGERY.

UNDER THE CHARGE OF

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THE USE OF THE CHAIN-SAW FOR EXPOSING THE BRAIN.

DR. EGBERT BRAATZ of Königsberg writes a practical paper on this subject in the *Centralbl. f. Chir.*, Leipzig, Jan. 22, 1898. The classical method of opening the skull by means of the trephine does not comply with all the requirements of cerebral surgery. The use of the hammer and chisel, though doubtless efficient, so far as the mere removal of the bone is concerned, is attended with an amount of violence to the head which is undesirable. The wheel-saw, whether driven by mechanical or electric power, is certainly a very rapid instrument, but, in using it, one is justified in harbouring fears that one may be cutting more than the bone; both dura and cerebral cortex have been injured when the wheel-saw has been employed to complete the section of the bone. On the other hand, this danger is lessened if the sections be completed by one or more strokes of the chisel at each of the corners of the flap. The author follows the example of Obalinski, in preferring the chain-saw in all cases in which it is desired to make a large opening in the skull. Four or more holes are to be made in the first instance at the corners of the proposed flap, with a small trephine or perforator, or, as preferred by the author, with an instrument fashioned on the principle of the carpenter's brace-bore or centre-bit. The dura is separated from the bone along the lines between the holes, and the string attached to the saw is then introduced at one opening and brought out at another. Special instruments have been devised by the author for each of these procedures, as also for protecting the dura while the saw is in action. He describes the saw as cutting through the skull from within outwards with playful rapidity. Of the two patterns of chain-saw, the finer one is selected. The saw-line appears as a narrow fissure. The flap, when replaced, fits with the greatest possible accuracy, and the original holes may be used for drainage if required. As in other methods, it is an advantage to apply the saw obliquely, so that the flap is broader at the level of the outer table; there is thus no tendency for the flap to be depressed within the gap, when it is replaced at the close of the operation. If the initial opening is not large enough, it may be increased to any extent. The method appears to be an excellent one. The author's example of practising it on the cadaver, in the first instance, might be followed with advantage.

THE SURGICAL TREATMENT OF EXOPHTHALMIC GOITRE.

THIS was the subject of an interesting discussion at the French Surgical Congress held in Paris in October 1897. M. Faure (of Paris) has excised the cervical sympathetic in three cases. In the first of these, the superior cervical ganglion, along with 5 to 6 cms. of the descending cord, was excised on both sides; after four months the exophthalmos had diminished, the goitre was less in size, the tachycardia and the general health had much improved. In the second, the entire sympathetic was resected on the right side (superior and inferior ganglion included), the superior ganglion and part of the cord only on the left (because of the onset of alarming syncope); this patient improved still more markedly than the first. The third case died on the table after the entire sympathetic cord had been removed on the right side and the dissection on the left side was about to begin. M. Faure nevertheless is of opinion that it is a "good operation," only in future he proposes to use ether instead of chloroform, and to operate on the two sides of the neck at different times.

Jonnesco (of Bucharest) believes very strongly in resection of the cervical sympathetic, and regards it as the operation of selection, because it is safe, easy, and efficacious in relieving all the symptoms. The entire cord, including the three ganglia, should be removed on both sides, otherwise there is no certainty of removing the accelerator fibres for the heart, or of resecting the vertebral fibres of the sympathetic, and of thus influencing all the vaso-constrictor fibres within the skull. In three cases in which this operation has been performed by Jonnesco, the results have been all that one could desire.

Doyen (of Paris) prefers thyroidectomy to resection of the cervical sympathetic, because the results which it has yielded in his hands are much superior to those described as following upon the latter procedure.

Sorel (of Havre) had found the operation of partial thyroidectomy easy, rapid, and practically bloodless in the five cases in which he had practised it.

Abadie (of Paris) referred to the occasional and unavoidable dangers which may attend a partial thyroidectomy in cases of exophthalmic goitre; his own view of the operation was, that it exposed the patient to the risks of death, of relapse, and of myxœdema, without any decided improvement of the exophthalmos. He recommends simple section of the cervical sympathetic above the middle cervical ganglion.—*Rev. de chir.*, Paris, 1897, No. 11, Suppl.

POST-ANÆSTHETIC PARALYSIS.

M. **SCHWARTZ** (of Paris) reports the case of a man, æt. 45, operated upon for the radical cure of hernia, who, on awakening from the chloroform, complained of formication in the right hand, especially in the thumb and index, and inability to move these fingers. The following day there was complete paralysis of the long flexor of the thumb and of the flexor of the index, and also of the quadriceps extensor of the right leg. Recovery ensued under the use of massage and electricity. At first the paralysis was ascribed to a lesion of the brachial plexus, but when the leg became involved it was regarded as cerebral in origin. M. Schwartz pointed out that there are two main groups of post-anæsthetic paralysis — First, those of peripheral origin, chiefly involving the brachial plexus or its branches, and partaking of the clinical type described by Erb. The muscles usually affected are the deltoid, brachialis anticus, triceps, and supinator longus. They are traumatic in origin, the nerve-trunks being compressed or stretched by traction on the arm in the abducted position, or by constriction with the elastic tourniquet. Secondly, those of central origin, which are very much rarer, and which may be classified as follows:—(1) Simple monoplegias; (2) paralysis of one or more cranial nerves, with or without paralysis of the limbs; (3) hemiplegias. Schwartz does not incline to regard these central palsies as mere coincidences, or as the result of intoxication by the anæsthetic; he believes they are met with in individuals who are the subjects of arteriosclerosis, who, during the period of excitement, rupture one of the cerebral vessels. In certain rarer cases, hysteria may account for the paralysis. Chipault (of Paris) referred to a case in which a right-sided hemiplegia was observed after an operation performed under chloroform; the patient died some time afterwards, and the autopsy revealed the existence of a ventricular hæmorrhage. Reboul (of Nismes) reported the occurrence of hemiplegia, after the operation of suprapubic cystotomy, in a man of 60, in which the administration of chloroform had been unattended with any incident.—"Cong. français de chir.," 1897, *Rev. de chir.*, Paris, Suppl.

PATHOLOGY AND TREATMENT OF PRIMARY TUBERCULOSIS OF THE KIDNEY.

THIS was the subject of an interesting paper by Israël at the last meeting of the Berlin Surgical Society. The teaching of Guyon, that tuberculosis of the kidney was usually the result of an upward extension from the bladder, has been reversed in the light of more extensive operative experience. In twenty-one cases in which the kidney was removed by Israël, the disease was primary in the kidney in sixteen. In three cases, although there was tubercle in the testicle, the disease was also primary in the kidney, and the bladder was not affected. Fully 30 per cent. of all suppurative conditions in the kidney are tubercular. Women are much more often affected than men (twelve out of sixteen cases). Tubercle of both kidneys is rare (12 per cent.). The majority of patients are between 20 and 40. Israël distinguishes the following types:—

1. *A caseating form, with the formation of cavities*, which is by far the most common (81 per cent.). In its advanced stages, the condition may closely resemble "simple" pyonephrosis; the tubercle originates in the boundary area between cortex and medulla, more often at the poles (especially the lower), and may long remain stationary and localised; at this stage, partial removal of the organ may be undertaken, and has been performed by Israël in one case with perfect recovery. Even in the advanced cases, the caseating form of renal tuberculosis yields the best results. Inasmuch as it is always possible to separate the parenchyma of the organ from its capsule, the author strongly recommends subcapsular enucleation as the routine procedure. Perinephritic abscesses are secondary to the disease in the kidney, either by the bursting of a tubercular focus into the surrounding tissue, or by extension along the lymphatics; in the latter case, the capsula propria remains intact.

2. The second form is met with as a *primary tubercular ulceration of the apices of the papillæ*, where these project into the calyces; it may be attended with profuse renal hæmaturia.

3. The third form is characterised by the presence of *numerous tubercular nodules scattered throughout the entire kidney*, without any tendency to softening. Death usually results from tuberculosis in distant organs. This form is fortunately very rare.

When tubercular disease of the kidney is left to itself, it tends to extend downwards along the urinary tract. Israël found the bladder infected in eleven out of twenty-one cases subjected to operation. Tubercle of the bladder is not to be regarded as a contra-indication to nephrectomy; the former condition is often influenced favourably by the removal of the diseased kidney. The condition of the other kidney is of greater importance. (The renal tuberculosis was bilateral in two out of sixteen cases.) The existence of waxy degeneration and nephritis is to be investigated. Catheterisation of the ureter is not conclusive, because albumin may be present in the urine from the other kidney, as a result of the diseased condition of the affected kidney, also because albuminuria is not a reliable evidence of renal tuberculosis; further, tubercle bacilli are very rarely to be demonstrated in primary tubercle of the kidney until the bladder has become involved. The simultaneous appearance of tubercle in the kidney and testicle, while the ureter and bladder are intact, proves that the former have been infected through the circulation and not by extension from one to the other.

The clinical symptoms of renal tuberculosis consist in disturbances of micturition, which are often misinterpreted as evidences of cystitis; increased frequency and urgent desire to empty the bladder, along with burning or pain during micturition, are characteristic. Pain in the kidney itself, or attacks of colic with pyrexia, are less frequent. Hæmaturia was present in four out of sixteen cases; in one case it was profuse and persistent, and was associated with primary ulceration of the apices of the papillæ. The disturbance of the bladder functions is not to be regarded as evidence of disease in the bladder itself, but for the most part as "radiation-symptoms" originating in the kidney.

Israël reports twenty-one cases of partial or complete nephrectomy with eight deaths; three of these were attributed to shock, waxy disease, and chronic nephritis of the other kidney, and occurred shortly after the operation. The remaining five deaths occurred after the wound was healed, and were due to tuberculosis of other organs.

In Israël's experience, *nephrotomy* affords only temporary relief, and usually requires to be followed by nephrectomy; its mortality is very much the same as primary nephrectomy; it is therefore only to be practised when the renal tuberculosis is bilateral, and where a rapid operation is imperative.—*Centralbl. f. Chir.*, Leipzig, 1st Jan. 1898.

Albarran (of Paris) reports eight nephrectomies with one death on the tenth day of meningitis, and eleven nephrotomies with one death. All the successful nephrectomies are still alive, while, among the ten nephrotomies, seven died after an interval ranging from three to seven months. These figures support the contention that nephrectomy is the better operation in renal tuberculosis. Nephrotomy is only a palliative operation. The respective indications for the two operations depend—(1) On the anatomical lesion of the affected kidney; (2) the condition of the other kidney; (3) the general condition of the patient. His conclusions may be said to agree with those of Israël.—*Rev. de chir.*, Paris, 1897, Suppl.

OBSTETRICS AND GYNÆCOLOGY.

UNDER THE CHARGE OF

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CULLINGWORTH, in an address to the Oxford Medical Society, gives some exceedingly interesting and valuable practical observations on the subject of ectopic gestation, which he has been able to acquire from a very extended experience in its operative treatment, amounting to forty-nine cases.

After discussing the various sites of implantation of the impregnated extra-uterine ovum, and mentioning the current theories regarding the causes of its abnormal attachment, the author shows that the nearer the seat of gestation is to the external end of the tube, the greater the tendency to occlusion of the abdominal ostium about the sixth or eighth week. Previous to this, however, there is not infrequently abnormal expansion of the mouth of the tube. He strongly combats the current teaching that rupture of the tube is the cause of the majority of pelvic hæmatoceles, and maintains that hæmorrhage into the peritoneal cavity is in most instances due to the free escape of blood through the open abdominal tubal ostium. This is due to the preponderating tendency of tubal gestations to be terminated by their formation into fleshy moles, from the abnormal conditions surrounding the ovum, which render hæmorrhages in and around it particularly liable to occur.

The intraperitoneal effusion of blood is the result, therefore, of the escape of blood, extravasated from the seat of the mole through the patent abdominal ostium, a process closely simulating the hæmorrhage associated with threatened abortion in a normally situated intra-uterine gestation. This effusion is usually in the form of a gentle stream or trickle, sufficiently slow to allow of the formation of a defined intraperitoneal hæmatocele. This contention he has verified from observation of twenty five cases operated on for pelvic hæmatocele, in twenty-three of which the blood escaped through the patent ostium. Should actual rupture of the tube occur, the bleeding is too rapid and profuse to favour the formation of a hæmatocele, and it is thus associated with a free, unlimited, intraperitoneal effusion. Of ten cases in which he operated for ruptured tubal gestation, in only one was there a defined hæmatocele. In one case operated on, a true tubal abortion had occurred, the ovum having been expelled through the patulous ostium into the peritoneal cavity.

The diagnosis of early tubal gestation, before hæmorrhage in or around the ovum has occurred, the author considers must be a happy accident, and he believes that all cases supposed to be diagnosed before rupture have been "tubal moles," in which the diagnosis is necessarily easier, from the pain and irregular uterine hæmorrhage with which they are usually associated.

These irregular hæmorrhages are of great importance in the diagnosis, from the special features in their appearance. "The blood is almost invariably dark in colour, moderate in amount, thickish in consistence, and steady in its rate of flow." By close consideration of these features, it is usually possible to differentiate between the bleeding the result of a tubal mole, from that of a threatened or incomplete abortion, as in the latter the discharge is often copious, fitful in its rate of flow, and variable in its colour and consistence. The other signs and symptoms in reference to diagnosis are practically discussed. Amenorrhœa, when present, is extremely valuable, but is not constant. The position of the tubal swelling, though frequently lateral, is not necessarily so, while marked pulsation in the vaginal fornix on the side of the gravid tube is a sign of much value. After intraperitoneal effusion of blood has occurred, the severe pain, increased temperature, abdominal distension, pallor, and collapse are the main indications of the condition. If a hæmatocele is formed, its position is not necessarily central, though most frequently so; and in this situation it is most apt to be confounded with a retroverted gravid uterus, from which it alone can be distinguished by the palpation of the fundus uteri in front of the swelling. The treatment recommended is the removal of the gestation, which the author has done successfully thirty-nine times in his forty-two cases. The article bristles with valuable practical information.—*Clin. Journ.*, London, Dec. 1897.

THE TREATMENT OF CANCER OF THE UTERUS DURING PREGNANCY.

MITTERMAIER (*Centralbl. f. Gynäk.*, Leipzig, 1898, No. 1) remarks that until lately it was thought necessary to wait for the complete involution of the uterus before performing total extirpation. But as the result of improved technique, and the tendency to rapid growth of cancer during the puerperium, Olshausen and Pehling specially advise that the operation be performed at once. Olshausen recommends that in cases of cancer of the cervix occurring during pregnancy, at the fifth or sixth month, after the escape of the amniotic fluid, the uterus, with placenta and fœtus, should be removed by vaginal extirpation. In cases reaching the seventh month, he advises vaginal Cæsarean section (after Dührssen), to be followed by vaginal total extirpation.

Mittermaier records two cases. The first, a woman æt. 47, who had miscarried at the sixth month, followed by high temperature; and as the posterior lip was found cancerous, the whole uterus was extirpated per vaginam. On account of the softness of the parts, and the ease with which the uterus could be pulled down to the vulva, the operation was not difficult. The second case, a woman æt. 43, seven months pregnant, complicated with cancer of the cervix. The latter was dilated, child extracted, and then total extirpation performed. In both cases Mittermaier states that the operation was not more difficult than an ordinary vaginal hysterectomy.

VAGINAL TOTAL EXTIRPATION OF A CANCEROUS UTERUS AT THE END OF PREGNANCY.

FRITSCH (*Centralbl. f. Gynäk.*, Leipzig, 1898, No. 1) states that, although many cases of vaginal extirpation during pregnancy have been recorded, none have been successfully performed at full time—the reason being that usually such cases are diagnosed before the end of pregnancy, and operated on at once. The cachexia, loss of blood, and discharge lead frequently in such cases to the death of the child, and consequently to the end of pregnancy. Fritsch has, on two occasions, successfully performed total extirpation by the abdominal method, but it is a long and difficult operation, and has other drawbacks, *e.g.* one has to work more or less in the dark, and has to depend on feeling the parts to find out if one is cutting into healthy tissue. In both cases there was early recurrence of the disease.

Fritsch thought that on account of the size of the uterus at the end of pregnancy, he would have difficulty in performing the vaginal extirpation, as he previously had difficulty in removing a puerperal septic uterus during the second week of the puerperium. He records the case of a woman, confined three and a half years previously, who during her last pregnancy had suffered from intermittent hæmorrhagic vaginal discharge, the result of a localised cancer of the cervix. He had decided to perform Cæsarean section, and follow this by abdominal extirpation. Next day, however, labour pains came on, and, after making free incisions into the cervix, he delivered with forceps,and then extirpated the uterus, which he states was easily carried out. The patient recovered.

Fritsch emphasises the importance of performing this operation in preference to the abdominal method, or Cæsarean section. He also states that in cases of rupture of the uterus, vaginal total extirpation promises success. During laparotomy in such cases, one frequently sees a small aperture in the peritoneum, and under this a large wound in the parametrium; and he thinks that one can see those injuries better by pulling down the uterus than by raising it up in the abdominal cavity.

THERAPEUTICS.

UNDER THE CHARGE OF

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IODOTHYRIN (THYROIODIN).

As is now well-known, Baumann and Roos in 1895 isolated from the thyroid gland of the sheep a substance containing iodine, to which they gave the name thyroiodin (iodothyrin). It was obtained in the form of a brown amorphous powder, nearly insoluble in water, but freely soluble in alcohol and in alkaline liquids. The sheep's thyroid yields about 0·2 to 0·5 per cent. of it. Iodothyrin is a non-albuminous substance, and contains about 10 per cent. iodine and ½ per cent. phosphorus, both in intimate organic combination. It is an extremely stable body, resisting the action of boiling in 10 per cent. sulphuric acid, and being entirely unaffected by digestive ferments. In separating it out, advantage is taken of these properties. The finely-chopped thyroid gland is placed in about four times its weight of 10 per cent. sulphuric acid and boiled for about eight hours. On cooling, all the organic material is found to have gone into solution, except the fat which floats on the surface, and the iodothyrin which falls to the bottom as a brown amorphous precipitate. It is purified by solution in alcohol, evaporation of the alcohol, solution of the residue in weak alkali, and reprecipitation by adding an acid. It can also be obtained by digesting minced thyroid gland with artificial gastric juice for two days, or until all the proteid matter is dissolved. It seems to exist in the gland partly free, partly in combination with albuminoid material, and is said by the authors to represent the entire therapeutical activity of thyroid preparations (*Ztschr. f. physiol. Chem.*, Strassburg, Bd. xxi. S. 319).

It is now made on a manufacturing scale, and as the dose is extremely small it is mixed with lactose and sold by the firm (Fried. Bayer & Co.), under the name iodothyrin. One gr. of iodothyrin represents in activity 1 grm. (15 grs.) fresh sheep's thyroid, and contains 0·3 mgrms. iodine (about $\frac{1}{210}$ gr.). It is a whitish powder, tasting of milk-sugar, and can be ordered in tablets or in powder. The effective dose for adults is 15 to 30 grs. daily, or more, beginning always with a smaller dose, and for children 4 to 15 grs. daily. It is claimed that it is preferable to thyroid gland preparations, or even to the fresh thyroid, as it is of constant composition, and, being freed from albuminous matters, keeps well.

Baumann and Roos (*Ztschr. f. physiol. Chem.*, Strassburg, Bd. xxi. S. 481) describe the thyroiodin as present in two proteids—one an albumin, the other a globulin—from both of which it can be split off as above described. Robert Hutchison, however (*Journ. Physiol.*, Cambridge and London, vol. xx. p. 474) finds that there is only globulin loosely united to the non-proteid iodine-containing substance. He finds also that the colloid material is the chief constituent of the gland, that it contains all the therapeutically active body, and that it can be readily split up into a proteid part and a non-proteid part (the iodothyrin of Baumann). He holds that both of these are possessed of activity, but the latter in much higher degree than the former. According to Hutchison, the proteid part also contains a small amount of iodine. (As previously noted, Baumann and Roos are of opinion that only the iodothyrin (the non-proteid part) is active, and it is possible that Hutchison may not have completely separated the two. Exact information on this point is lacking, however.) The extreme stability of iodothyrin, and the fact that it resists the action of digestive juices, explains the activity of thyroid gland when given by the mouth. It is also said to act more rapidly and surely than the gland or its ordinary preparations, the explanation given being that it is at once absorbed; and, further, that when the gland itself is administered all the iodothyrin contained in it is not utilised in the body.

Further contributions, confirming the activity of iodothyrin, were subsequently made by Baumann (*München. med. Wchnschr.*, 1896, Nos. 14 & 20; *Ztschr. f. physiol. Chem.*, Strassburg, Bd. xxii.), but they simply confirm and extend somewhat his original statements. Roos made observations on its effects in goitre, myxœdema, psoriasis, and on metabolism, the results of which coincided with the previously known action of the whole gland, and which all went to confirm the view that it is the active constituent (*Ztschr. f. physiol. Chem.*, Strassburg, 1896, Bd. xxii.). He found that 1 to 2 grms. daily, improved recent parenchymatous goitres in two or three days, and ultimately effected a cure. Old cases, especially if cystic or fibrous, were not altered.

Goldmann and Baumann (*München. med. Wchnschr.*, 1896) found that dogs from which the thyroid had been removed remained in good health as long as iodothyrin, 30 to 90 grs. daily, was administered to them. It does not seem to be retained in the body, but is rapidly excreted in the urine. Whether it undergoes change in the organism was not determined. Ewald (*Verhandl. d. Cong. f. innere Med.*, Wiesbaden, 1896), and Leichtenstern have proved its efficacy in myxœdema and other conditions. Treupel in two communications (*München. med. Wchnschr.*, 1896) has also observed its effects. In a case of myxœdema he found that it had exactly the same action as the whole gland, that it increases the chemical activity of the tissues (more oxygen being used and more carbonic acid gas being given off), that it lessens body weight, improves the nutrition of the skin, and increases the pulse rate—these effects lasting for weeks. He thinks iodothyrin represents the whole therapeutical activity of the gland. In a man æt. 46, 1 grm. daily increased the average excretion of nitrogen from 14·8 to 21·3 grms. per diem. Emaciation, with slight irregularity and increase in the rate of the pulse, were the only unpleasant effects seen. In frogs he found that 1½ to 15 grs. had no poisonous effects, although iodine was found in quantity in the thyroid subsequently. In rabbits it produces also no toxic symptoms, and seems to be all excreted in the urine, none of it apparently being stored in the organs. In a dog from which the thymus had been removed and which was in consequence subject to tetanic attacks, these were prevented by iodothyrin.

Hildebrandt (*Berl. klin. Wchnschr.*, 1896), in dogs on which thyroidectomy had been performed, found that they were maintained in life and in health by giving them iodothyrin, while salts of iodine had absolutely no effect. Hofmeister (*Deutsche med. Wchnschr.*, Leipzig, 1896) got exactly the same results in rabbits. Magnus-Levy (*ibid.*, 1896), in a case of sporadic cretinism with myxœdema, found it as active as tabloids of the gland. Hennig (*München. med. Wchnschr.*, 1896) used iodothyrin in cases of obesity, without any dietetic restrictions. As a rule, the patients lost over 2 lb. per week, but in some cases very much more, especially at the beginning of the treatment. In cases of goitre he got little or no improvement, nor in exophthalmic goitre. His patients occasionally suffered from the ordinary symptoms of thyroid treatment—malaise, headache, faintness, insomnia, pains in back and chest, anorexia, tremors, increase in pulse, albuminuria, and glycosuria. These all passed off, however, as soon as the drug was stopped. He gave usually 15 grs. daily. Grawitz (*München. med. Wchnschr.*, 1896) treated two women with iodothyrin for obesity. In one, dietetic treatment had had no effect, but on unrestricted diet she lost over 10 lb. in eight days with iodothyrin. The other lost about 2 lb. per week. No unpleasant results were seen with 15 grs. daily dose.

Stabel (*Berl. klin. Wchnschr.*, 1897) found it very active in cases of parenchymatous goitre. On clinical grounds alone he holds iodothyrin proved to be the active principle of the gland. Although dearer than other preparations, he thinks it preferable, as it allows exact dosage, and is not liable from its mode of preparation to contain decomposition products, ptomaines, extractives, etc.

Vamossy and Vos (*München. med. Wchnschr.*, 1897) have made an experimental research on the action of iodothyrin, to ascertain its effects on the heart and respiration especially. They find no change in the blood except a slight leucocytosis, the heart and blood pressure and respiration remained unaffected. They are of opinion that (as in the case of the whole gland) few of the poisonous symptoms can be attributed to the direct effect of iodothyrin, but result indirectly from the profound changes in metabolism which are brought about by its administration.

Lanz (*Therap. Wchnschr.*, 1897) has used iodothyrin in children suffering from parenchymatous goitre with excellent results; scrofulous glands were beneficially affected, and in myxœdema the effect was satisfactory. In psoriasis he got no improvement. Four grs. twice daily were given, and always agreed well, except in one case where marked emaciation occurred.

Paschkis and Gross (*Wien. klin. Rundschau*, 1896) have treated numerous cases of psoriasis with it, beginning with 7 grs. daily and gradually increasing the dose. No other treatment was used, and in every case the cure was complete. They attribute the curative action to increased circulation in the skin, and state that hyperæmia of the affected patches can be readily observed. The improvement cannot be due to the small amount of iodine present, nor to the increased general metabolism, because it begins before the body weight is affected.

Critchmaroff (Thèse de Lyon, 1897) considers the action of iodothyrin on goitres more rapid than that of thyroid extracts or of iodine. Iodine in fact only favours the production of iodothyrin in the gland, and thus indirectly leads to cure. He treated four cases of recent goitre in young subjects with good results; in old and cystic cases it does no good. He confirms generally the results of his predecessors with iodothyrin, but adds that its mode of action is quite unknown.

Brian (*Lyon méd.*, 26th Sept. 1897) gives some photographs showing the result of treatment in these cases of goitre.

Iodothyrin does not seem to have been used hitherto in Great Britain or in America.

THYREO-ANTITOXIN.

UNDER this name S. Fränkel described a substance ($C_6H_{11}N_3O_5$), which he had isolated from the thyroid gland, and which he claimed to be its active principle (*Wien. med. Bl.*, 1895). It differs entirely from Baumann's iodothyrin, as it is very soluble in water, and contains no iodine. In the same journal (No. 51, 1896) he again puts forward the claim that this substance is active. It seems to be certainly proved, however, that whatever its action, it is not the therapeutically effective constituent of the thyroid gland. Magnus-Levy (*Deutsche med. Wchnschr.*, Leipzig, 1896), in a case of myxœdema, got improvement with iodothyrin and with thyroid tablets, but absolutely none with thyreo-antitoxin. Roos found that it (*München. med. Wchnschr.*, 1896) had absolutely no effect in increasing the metabolism in a dog, while iodothyrin did so very unmistakably. Hutchison also found (*Journ. Physiol.*, Cambridge and London, vol. xx.) that all the extractive substances (which must include this body) are inert. On the other hand, Grünfeld (*Wien. med. Bl.*, 1896) treated ten cases of exophthalmic goitre, psoriasis, corpulence, and eczema with doses of $\frac{1}{3}$ to $\frac{1}{2}$ gr. In seven cases the patients lost weight, the others gained or remained stationary. In the three cases of exophthalmic goitre, the action was very trifling, and in the skin cases local applications were also used. Four cases of goitre, treated by H. Schrötter, also failed to give any very striking results.

It may definitely be concluded, therefore, that the evidence now before us negatives the claim that the so-called thyreo-antitoxin is therapeutically active.

ACTION OF THYROID GLAND IN INSANITY.

HENRY J. BERKLEY (*Johns Hopkins Hosp. Bull.*, Baltimore, July 1897) states that, when administered to man or animals, thyroid gland is apt to cause grave symptoms, and, when pushed, death results from convulsions or emaciation, with symptoms of poisoning of the central nervous system. He treated eight insane patients, beginning with 5 grs. of the fresh gland daily, and rapidly increasing it to 10 and 15 grs. One of these, a girl æt. 17, suffering from adolescent insanity, showed marked improvement on the fourteenth day; treatment was continued till the twenty-second day, and she was discharged cured one week later. In all the other cases the author thinks the thyroid did harm on the whole, but they were all chronic, and did not offer much hope of improvement under any kind of treatment. The physiological effects of the drug were well marked in all of them. Loss of weight and tachycardia were constant symptoms; also weakened heart action, indigestion, slight pyrexia, and diaphoresis. There was always irritability, and a greater or less degree of motor excitement, no matter how demented the patients were. Two became frenzied, and one died of acute tuberculosis during the treatment. When long-continued, the administration always caused a peculiar gelatinous feel of the skin, like what one sees in myxœdema. Five mice and three guinea-pigs were killed by giving them thyroid gland for some days, and the nervous system was carefully examined microscopically. No changes were made out.

A CONTRIBUTION TO OUR KNOWLEDGE OF THE THYROID GLAND.

IN view of the foregoing and of other researches, it is remarkable to find Hermann Munk (*Virchow's Archiv*, 1897, Bd. cl. S. 271–305) traversing most of the conclusions at which many investigators have arrived. The author's high reputation and the place of publication stamp his paper as a serious contribution to our experimental knowledge of the physiology of the thyroid gland.

He begins by summarising the current views as follows (condensed):—"The thyroid is an organ highly important and necessary for a normal life. Its loss causes serious illness and death, in that the products of normal metabolism poison the central nervous system, so that nervous and metabolic disturbances occur (tetany and cachexia). Normally the thyroid secretion acts as an antitoxin to these products; and the administration of thyroid secretion prevents these symptoms. The special active principle is iodothyrin, which is formed and stored in the gland." Munk denies these propositions *seriatim*.

1. The thyroid gland is not absolutely necessary for life or for health. Munk's experiments with total removal show that in 50 per cent. of monkeys and rabbits, and in 25 per cent. of dogs and cats, no bad effects or only very slight transitory illness result. Some of these animals showed accessory glands on examination, but others did not. Munk, however, thinks this of no consequence, as he does not believe

in the supposed function of the so-called accessory thyroids. The animals which survived the removal remained in good health, and fat. Those which died had tetany and clonic spasms. Cats after thyroidectomy conceived and bore kittens which were healthy.

2. After thyroidectomy metabolic products do not poison the central nervous system, so as to produce tetany and a special (myxœdematous) cachexia. Some animals never show any symptoms; in others, spasms and tetany arise at very varying periods after operation, sometimes on the first day, sometimes many days after. These ,attacks may never recur, or may recur many weeks after, and may result in death. Individual peculiarities of the animals or of the poison can scarcely account for such differences; hence two results of the thyroidectomy have been described—(1) Acute tetany, and (2) a chronic cachexia without spasms. This, according to Munk, is mere assumption. He attributes the cachexia to the animals not eating; he says that it has no distinctive (myxœdematous) symptoms, but is common in animals after any serious operation and kept in captivity. Monkeys and rabbits suffer most, dogs and cats less.

He criticises very adversely and wholly denies the results of Horsley's experiments on monkeys. Horsley's animals, after thyroidectomy, died comatose in four to seven weeks. Munk performed seventeen similar experiments on monkeys, and thirteen of them lived for from one to nine months without showing the slightest trace of myxœdema or cretinism, nor in fact any of the symptoms described by Horsley, except tremors and tetany, which were also often absent. A second series of experiments by Horsley contradict the results of the first, and Munk states that he has found that Horsley's explanation of the different result (difference of temperature at which the animals were kept) does not hold good. He also criticises and denies the results of experiments by Langhans, Edmunds, and Murray, and others.

3. The symptoms occurring after removal of the thyroid gland cannot be prevented or removed by giving gland substance. After thyroidectomy, when thyroid gland preparations are given, tetany sometimes occurs and sometimes not. Munk says that few of the experimenters know the clinical features of tetany in animals. Different experimenters, after making many experiments in his laboratory, found that after thyroidectomy the giving or withholding of thyroid gland preparations made no difference to the animals.

He finishes his paper as follows:—"I have therefore shown that a considerable number of animals are ill, either not at all or only slightly and transitorily, as a result of thyroidectomy. It is self-evident that an organ is not necessary for life, if, for weeks and months after its removal, an animal remains in good health. One cannot, therefore, maintain that all animals die of tetany or cachexia after removal of the thyroid, if they fail to die of some intercurrent disorder. The experiments hitherto simply show that its removal endangers life, but not that the thyroid is an organ necessary for life."

This is simply a short outline of a very startling paper. The experimental results of Horsley and others have hitherto been received without question, but Munk's experience and conclusions can only be properly described as in direct and irreconcilable antagonism.

PATHOLOGY AND BACTERIOLOGY.

UNDER THE CHARGE OF

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Locomotor Ataxia.

Reference was made in the last abstract of pathology to the localisation of the cord changes in this most important disease. The earlier changes are not so well determined as those of the matured stage, as we have fewer chances, other than clinical, of studying them. Williamson (*Med. Chron.*, Manchester, October 1897) has put on record the changes found by him in a case of about three years' duration. The patient was a man æt. 40, who died in two days from the effects of a street accident. About three years before, he began to complain of lightning pains in his back, and inco-ordination in the legs came on about the same time. He had had gonorrhœa and a chancre at the age of 26, but there was no history of secondary symptoms. At the time of his death the gait was distinctly ataxic, and he could not stand with his feet together and his eyes closed. The knee-jerks were absent. There was no ankle-clonus. There was distinct inco-ordination in the movements of the arms. The pupils reacted to accommodation, but very feebly or not at all to light. The condition of the fundus is not stated. There was no paralysis of the bladder or rectum, but he complained of severe pains in the back and left hip. There was an ill-defined area of analgesia on the front of the right thigh. The naked eye was unable to detect any changes in the cord, not only in the fresh state, but even after hardening (Muller's fluid). Numerous pieces of the cord from all three regions were imbedded in celloidin, and stained by appropriate methods. The posterior nerve-roots and the anterior-tibial nerve were also examined. The latter showed no signs of neuritis, and the former, between the intervertebral ganglia and the cord, were but little affected, perhaps a slight increase of the interstitial connective tissue, but nothing else. The cord, on the other hand, showed well-marked sclerosis in the lumbar, dorsal, and cervical regions, being most marked in the first named. The other columns were not affected. In the middle and upper lumbar regions the sclerosis was most marked between the caput of the posterior horn and the entrance of the posterior intermediate septal artery into the white matter of the cord. A curved line joining these two points would indicate the region where the sclerosis was most intense. In many sections the sclerosis was limited to that part of Burdach's column adjacent to the caput of the horn, *i.e.* the middle third of the external bandlet, being most intense to its inner side. In the lowest lumbar region it was a little greater than in the middle and upper lumbar regions, extending more medianly into the adjacent matter of Burdach's column. A semicircular area at the posterior part of this column (the posterior internal root zone of Marie) was less degenerated than the rest, and the median part of Goll's column, especially in the posterior two-thirds, was less affected. The anterior part of the posterior columns was almost normal. There was well-marked degeneration of the fine nerve-fibres of Lissauer's column (at tip of posterior horn). The walls of the artery were much thickened in the sclerosed regions. In the dorsal and cervical regions there was secondary degeneration in Goll's columns, and the degeneration in Burdach's columns had much the same distribution as that in the lumbar region, but it was less marked. The posterior vesicular columns of Clarke showed marked degeneration. The other strands were normal.

Grasset read an interesting paper on this subject at the Moscow Congress, a résumé of which is given in the *Gaz. méd. de Liège*, August 26, 1897. He first draws a parallel between locomotor ataxia and disseminated sclerosis, and indicates how a number of valuable suggestions as to treatment of both diseases may be made from a careful study of the pathological lesions. Locomotor ataxia resembles disseminated sclerosis—(1) In often showing in its early stages sparse scattered sclerotic lesions (we would like to know the author's proof of this statement); (2) in possessing other anatomico-clinical syndromes, which correspond to other scattered centres of sclerosis of the nervous system; (3) in being frequently associated in the same subject with various scleroses of other organs besides the nervous system. The etiology of both diseases is very complex. Syphilis is the most frequent cause, but it is not the only etiological factor, even in cases in which it is found. Arthritis, different intoxications, the neuropathic disposition, and several other causes may all co-operate to produce the disease and determine its localisation in the cord. His view as to the curability of the disease is much more hopeful than that generally entertained. He thinks that it is curable, and that facts clearly prove that it may be clinically cured, even though the lesions remain. Short of this, the disease often shows a cessation of activity, remissions and retrogressions of considerable duration, which are highly desirable for the patient. Periods of relief may be obtained even in less favourable cases. It is, therefore, not an implacably progressive disease, and the author thinks that there is ample room for further study and revision of its treatment. The results to be desired may be classed under three heads—(1) The cure or amelioration of the anatomical state of the cord; (2) the re-establishment of the functions of the diseased cord; (3) the disappearance of the painful symptoms. The first may be reached by means directed to the cause or causes in each case, and to the pathological lesions. Antisyphilitic treatment should therefore be considered, and he thinks that not only is it not harmful, but often beneficial, and it may even cure. It is important to find out if previous syphilis is certain, probable, or only possible. It is better to employ a mixed treatment for the first three months; and later, if it is thought advisable to return to this same treatment, it should be regulated according to the results the physician obtained during these early months. Chlorinated and sulphuretted waters should also be tried. Anti-arthritic treatment should be borne in mind, and accomplished by means of the alkalies, arsenic, iodides in weak doses, diet, hygiene, and certain mineral waters. In the same way the neuropathic diathesis and other possible causes must be met by appropriate remedies. With regard to the lesions in the cord, he thinks that certain drugs, *e.g.*

the iodides, especially tincture of iodine, and the silver salts, may exert an influence upon the scleroses. In the acute and subacute stages ergot should be given. He also considers what he calls an antisclerotic diet to be very important. The other measures which may be directed towards the lesions are certain electrical treatment, elongation of the nerves, but little used at present, and different methods of elongating the cord, such as suspension, and regulated bending movements. Suspension is a useful measure in essentially chronic phases. It should not be used in the active and progressive stages, but rather to the resulting sclerosed and cicatrised after-stage. The re-establishment of the functions of the diseased cord may be aimed at by these same means, and by a re-extrication of the muscle after Fränkel's method. This is really through a re-education of the brain, or the development by cerebral action of a cord compensation, compatible with the persistence of the lesions. This method should not be used during the acute or subacute phases, but may be employed at other times when the sight, the intellectual functions, and the muscular power are sufficiently preserved. The lightning pains and visceral neuralgias are combated with all forms of sedatives, *e.g.* opium (avoid injections of morphia as far as possible), antipyrin, etc. Oxalate of cerium may relieve the gastric crises. Cold water, chloroform, electricity, and mineral waters may all help to remove painful symptoms. For deficient muscular power nerve transfusion may be used, or, still better, injections of artificial serum and glycero-phosphates. Internal tonics (general and special), massage, electricity, hydrotherapy, and mineral waters are also useful. To combat the neurotic phenomena, which he thinks should have more attention, we may use suggestion, certain electrical applications, hydrotherapy, and mineral waters.

The Visceral Lesions in Superficial Burns.

Bardeen (*Journ. Exper. Med.*, New York, September 1897) has written a paper on this subject which is likely to attract some attention. It is based upon a study of the cases of five children, whose ages ranged from 16 months to 8 years, and in whom death followed in from four to nine and a half hours after the burn. The most remarkable and interesting changes were found in the lymphatic tissues throughout the body. They all suffered, especially the lymphatic glands, though the lymph vessels and sinuses were also injured. The earliest change was apparently a general œdema of the glands, most marked in the centre of the lymph follicles. Some congestion followed, and sometimes karyokinetic figures could be seen within the cells, which disappeared at a later stage. Marked degenerative changes producing foci of necroses came on in from two to three hours. The glands looked swollen to the naked eye. The spleen was enlarged and soft, and its Malpighian bodies showed much the same changes as did the lymphatic glands. Similar changes were seen in the tonsils, the solitary glands of the stomach, and in the solitary and agminated glands of the intestines. They were most severe in the last situation, the swollen glands projecting above the surface of the mucous membrane. The liver and kidney showed cloudy swelling, and the thoracic and abdominal organs a moderate degree of hyperæmia. The larger and deeper vessels of the skin and subcutaneous tissues contained a few thrombi, which were not observed elsewhere, *e.g.* the vessels of the internal organs. The blood showed considerable poikilocytosis and leucocytosis, chiefly multinuclear. The author argues that all these visceral and other changes, particularly those of the lymphatic system, are similar to those seen after fatal cases of certain fevers, and that they are due to a general septic or toxic infection of the body, proceeding from the superficial burn, and that they might therefore be prevented by a strict antiseptic and aseptic treatment, especially in cases which come under our care at once.

GONOCOCCUS TOXIN.

REFERENCE has already been made by us to a new method of cultivating the gonococcus, and Christmas (*Ann. de l'Inst. Pasteur*, Paris, 25th August 1897) adds still further to our knowledge of this subject. The objection to the growths of the gonococcus in human serum, or pleuritic or ascitic fluid and gelatin, is their short vitality, a few days at most. On rabbit serum the growth is very rapid and may be kept alive for months. The colonies begin to appear in twelve hours. They are rounded and transparent. It fails to produce the disease when injected into human beings, and dies in about twenty-four to forty-eight hours. A toxin may be separated from a cultivation upon ascitic fluid (1 part) and peptone bouillon (3 parts). Injection of this toxin into the human urethra produces a suppurative urethritis, exactly resembling an ordinary gonorrhœa, but no gonococci can be detected in the discharge. Gradually increasing doses were injected into the veins of a goat, and an anti-gonococcus serum was thus obtained. It was of feeble strength, and could not confer immunity from the toxin or the gonococcus injected into the urethra, but the author thinks it may yet prove of value in gonorrhœal urethritis and other general infections.

PATHOLOGICAL PHYSIOLOGY OF THROMBOSIS, OR BLOOD COAGULATIONS.

CORNIL (*Gaz. d. hôp.*, Paris, 28th August 1897) gives the results of a study of the changes he has observed in the process of clotting of the blood within the vessels during life. Organisation of the intravascular blood clot is made at the expense of the endothelial cells lining the lumen, both in veins and arteries; the fibrinous network of the clot serving only as a scaffolding or support for their development. The phenomena of organisation are very rapid. On the first day there is a modification of the endothelial cells. Capillaries appear about the third or fourth day, and connective tissue about the ninth or tenth. Infection of the blood clot delays both the extent and rapidity of the process of organisation, though a certain degree of traumatism may favour them. The phenomena of organisation are everywhere the same, *e.g.* vessels, heart, lung, and ordinary connective tissue. It is always the lining endothelium which starts the process, and it is most perfectly seen in the connective tissues.

PHYSIOLOGY.

UNDER THE CHARGE OF

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Action of Ciliary Muscle in Accommodation.

More than a year ago, Professor Hess of Marburg read a paper on displacements of the lens during strained accommodation before the "Ophthalmologische Gesellschaft." Entoptically he showed that during great contraction of the ciliary muscle the lens is displaced downwards. That is to say, owing to the greatly relaxed zonule of Zinn, the lens falls by reason of its own weight. If the person be looking straight forwards, then it falls directly downwards; if the head be turned to the right side, the lens in the right eye falls toward the side of the right temple; if inclined to the left, then towards the nasal side. These observations went to prove the correctness of the classical view of Helmholtz, that the zonule is relaxed in strained accommodation by the contraction of the ciliary muscle drawing forward the choroid and the ora serrata lying on it.

The view expressed by Tscherning, and strongly held by Schön in Germany, that in accommodation for a near object the zonule is put on the stretch by the contraction of the ciliary muscle, which draws on the former just as if it were a tendon, so that the equator of the lens is displaced backwards, and is bent over the corpeus vitreum, just as a rod may be bent over the knee, has been vigorously opposed by Hess and Heine.

According to Tscherning and his followers, the reason why the anterior surface of the central part of the lens increases in curvature more than the peripheral parts is, that the stretched zonule does not only draw the extremities of the lens backwards over the vitreous, but also draws them outwards. This, however, is no proof against the Helmholtz hypothesis, as the lens is not simply an elastic bag filled with fluid, but a highly organised body, whose central parts are morphologically and chemically distinct from the peripheral parts. There is no reason why the lens should increase regularly in curvature from periphery to centre. The crucial point to settle was the condition of the zonule in strained accommodation. Is it stretched or is it relaxed? If Hess be correct in stating that there is a displacement of the lens downwards in positive accommodation, there must be a relaxation and not a stretching of the zonule. The displacements of the lens, as noticed by the entoptical method, may be measured.

This displacement of the lens may be easily shown by the following experiment (Heine, "Bericht über die 26te Versammlung der ophthalmologischen Gesellschaft," Heidelberg, 1897. If two fine horizontal threads be suspended in front of the eye, one at a metre distance and one at the near point, and if now the eye fix the latter, it alone will be seen, because the distant object is covered by the near one. The lens has now attained its maximal curvature, and is incapable of further alteration in form.

The ciliary muscle, however, can contract still more on strained accommodation, especially well-marked after the action of eserine; and when it does so, the near object appears as if it had moved upwards. This, of course, is explained by the movement of the focal point downwards, due to the lens falling. Heine measured this displacement, and found it to be, without the aid of the eserine, from ·2 to ·3 mm., while after eserine it amounted to ·5 mm.

Objectively, also, Heine calculated this movement by measuring the displacement which an image reflected from the posterior surface of the lens underwent during strained accommodation, compared to one reflected from the corneal surface. The source of light was so placed that both images lay in the same horizontal line. Thus, for the same person, subjectively and objectively, the displacement may be measured and compared. Both have been found to agree.

Heine has also fixed the bird's eye in the act of accommodation, and has examined it microscopically. Beer has shown that the act of accommodation in birds is quite similar to that in man.

Unfortunately, it is still impossible to fix the lens in such a way that one may be sure that its form is due to the act of accommodation and that alone, but it is possible to study the condition of the ciliary muscle and its direction. This Heine has done for the first time, and has shown that from the direction of the ciliary muscle-fibres, in the contracted state, the zonule must be relaxed during positive accommodation. The zonule and the ciliary muscle run forwards divergently from the ora serrata with Fontana's space between. If the fixed point of the ciliary muscle really lay behind, it might pull on the corneal periphery, never on the zonule.

THE OUTPUT OF THE HEART.

AUTHORITIES differ as to the cardiac output per beat. Volkmann and Vierordt give it as 150 to 200 c.c. per beat in man (say ·003 of the body-weight per second), and in the dog ·00283 per second. Zuntz found the output in a dog weighing 25 kilos. to be ·00157 of the body-weight. Stolnikow got values ranging from ·00032 to ·0016 of the body-weight per heart-beat. G. N. Stewart (*Journ. Physiol.*, Cambridge and London, vol. xxii. No. 3, p. 159) adopted a new method, in order to find out whether the output might not be more accurately determined. He employed the following method:—A solution of common salt is allowed to flow for a fixed time into the heart, at an approximately uniform rate. The salt mixes more or less uniformly with the blood, passes into the general circulation, and at a convenient point of the vascular system a sample of the blood is withdrawn during the passage of the substance. A sample is also taken before injection of the salt. The quantity of salt solution which must be added to the latter, in order that it may contain as much of the former, is estimated. This gives us the means of estimating the extent to which the salt solution has been mixed with the blood in the heart. The quantity of the solution which has been run into the heart being fixed, we can calculate the output in the given time.

The time at which the salt arrives at any fixed spot in the vascular system is noted by Kohlrausch's telephone method, the sound becoming louder as the solution passes through that part of the vessel connected by means of platinum electrodes with the secondary of a small du Bois inductorium.

The way in which the Wheatstone's bridge and telephone are connected in the secondary circuit is fully described in books on experimental physics.

Into the corresponding artery on the other side a cannula is tied, and a sample of blood withdrawn before injection of the salt into the right side of the heart (through the external jugular vein), and then another taken when the salt solution is passing through the corresponding vessel on the other side. The pulse-rate is, of course, observed and noted.

Several assistants are required for the experiment. One notes the time during which the salt solution is run into the vein and the amount run in. Another, who has his ear at the telephone, whenever he hears the fluid passing through the vessel, makes a signal for a third assistant to collect and stop collecting blood from the corresponding vessel of the other side. The time is noticed by the observer at the telephone.

The specific resistance of each of the samples is determined, and to each of the portions taken before the injection, sufficient salt solution is added to make the resistance nearly equal to that of the portion removed during the passage of the salt. The extra quantity necessary to make the resistances exactly equal can than be easily calculated.

The results which Stewart obtained correspond pretty closely with those of Zuntz.

About 2·3, 3·39, and 3·84 c.c. per kilo. per second were the mean outputs for large, medium, and small dogs respectively.

DISEASES OF THE EYE.

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PARTIAL ATROPHY OF OPTIC NERVES AFTER BURNS.

It has been observed with a certain degree of frequency, after accidents by burning, and particularly where the surface of skin destroyed has been very extensive, that atrophy of the optic nerves has resulted. This atrophy may be secondary to other and more acute changes in the fundus, notably the presence of numerous retinal hæmorrhages, of retrobulbar neuritis, of papillitis, of retinitis, of choroido-retinitis, even where no albumin is present in the urine. In some at least of these cases the question arises, whether the iodoform employed in the treatment of the wounds is not to be blamed as the toxic influence leading to these lesions. It is known that iodoform is capable of giving rise to a form of toxic amblyopia, resembling somewhat closely that produced by alcohol or tobacco; and this condition has been seen in cases of hip-joint disease, in which there was no extensive superficial destruction of tissue, but in which the walls of the large abscess cavity were treated with iodoform, and in at least one case of phthisis where iodoform was taken internally in the form of pills. Simple congestion of the tissues, caused by the retreat of the blood from the superficial parts, cannot explain the ophthalmoscopic appearances in the cases of burning. But it must be remembered that the blood of persons injured by burning has been shown to be in a pathological condition, on account of the retention of toxins. The excretion from skin and kidneys being diminished, the blood becomes charged with the toxins of the body, to say nothing of any which may be absorbed from the wounded surface; and it is possible that the presence of such in the system may reveal itself by the development of hæmorrhages, inflammations, and atrophies, in a manner which may be analogous to the development of somewhat similar manifestations in Bright's disease. Whether, then, these eye symptoms be due to the burn in all cases, or to the absorption of iodoform (and similar substances) applied to the wound, the possibility of the occurrence of a condition so very serious ought to be borne in mind.—Terson, *Arch. d'opht.*, Paris, October 1897.

Diminished Secretion in Primary Glaucoma.

In primary glaucoma, one of the notable external signs is shallowness of the anterior chamber. That this is also a warning of liability to an attack of acute glaucoma, is well recognised. In a patient with such a condition, the unwise use of atropine, severe emotional disturbance, or what not, is capable of bringing on an acute glaucoma. Czermak (*Prag. med. Wchnschr.*, 1897) suggests that the shallowness may be due to an insufficiency in the supply of secretion from the ciliary body. He does not minimise the importance of the increase in size of the lens with advancing age, which Priestley Smith proved some years ago to exist; nor does he neglect the smaller dimensions of the globe in these cases also, but he points out that microscopic examination of senile eyes will show changes in the connective tissue, vessels, and secreting cells of the ciliary body, along with increase in size of these processes, which can hardly fail to bring about a diminution in the supply of fluid poured out. This will show itself by a lessened depth of anterior chamber. He asserts that in a patient with one eye in a state of congestive glaucoma, and the other presenting a normal aspect, save for the symptom under discussion, it will be observed that the anterior chamber of the "healthy" eye is shallower than that of the diseased. This is because, when the filtration angle becomes blocked (acute glaucoma), the aqueous humour does not get away, and the chamber becomes deeper.

If his theory is correct, then eyes which are predisposed to glaucoma might, as Priestley Smith points out, be expected to have actually subnormal tension, which has not been observed, unless it might be that the exit channels diminished as the supply failed. Two points are somewhat in favour of the theory, namely, that after iridectomy for glaucoma, the anterior chamber fills up very slowly, and that blood effused among the aqueous humour is very slow of absorption in such patients, perhaps because of the comparative stagnation of the fluid. We have hitherto been apt to consider glaucoma as a condition in which *over*-secretion, or at least an over-full condition of the interior of the globe existed; and the theory of this being produced or led up to by diminished secretion seems at first rather improbable, but may perhaps prove to be correct.—Priestley Smith, *Ophth. Rev.*, London, 1897, p. 199.

THE ACTION OF RÖNTGEN RAYS UPON THE EYE.

It is now about ten years since Widmark made some very interesting investigations regarding the action, upon the anterior parts of the eye, of rays from various portions of the spectrum, and found the most of the effects to be due to those from the violet (actinic) end. He explained that to their richness in violet and ultra-violet rays is due the influence of lightning in producing irritation of the cornea, and sometimes cataract; of reflection in producing snow-blindness (and sun-burning?); of a powerful electric light in causing hyperæmia, etc. Lenses of rock crystal (the "pebbles" of the optician) permit readily the passage of the ultra-violet rays, and thus give little protection, but glass resists their transmission, and procures some immunity. He also showed that the crystalline lens absorbs most of the violet rays, though rarely suffering from this quality, as, however, occasionally happens as the result of lightning stroke; the lens and even the retina have been observed to fluoresce when played upon by ultra-violet rays. Chalupecký has continued Widmark's work in investigating the influence of the Röntgen rays, between which and the violet there are certain analogies. Thus, both have very short wave lengths; both display strong chemical action; both produce fluorescence under certain conditions; both are to a certain extent absorbed by certain media; exposure to either is apt to be succeeded by the production of much (protective?) pigment in the skin, etc., as is seen in sun-browning (which has been shown to be due to the actinic rays chiefly), and in patients on whom Röntgen rays have been allowed to play. But, from the present point of view, there are also strong differences in regard to reflection from polished surfaces, as well as refraction and polarisation; also crystal permits the passage of ultra-violet rays, and black paper arrests them; the opposite is the case with Röntgen rays. The leading features of Chalupecký's own experiments, as well as those of Brandes and Dorn, may prove interesting. A patient from whom the lens had been extracted (for myopia) perceived light when exposed to the Röntgen rays, suggesting that possibly the crystalline lens in the normal condition of affairs absorbed these rays; but then so did the observers also perceive a sensation of light. One of them, however, thought he perceived it more brightly with one of his own eyes, which happened to be aphakic, than with the other. All perceived a ring of light at the periphery of the field of vision, which was done away with when in the path of the rays, and in front of the eye was interposed a metal screen with an aperture only 2 mm. in diameter, fixed exactly opposite the pupil; when the aperture was increased to 4 mm., the ring was again perceived; when the plate or screen was made of aluminium (which is permeable by Röntgen rays), and on it a small lead (impermeable) disc was fastened, no light was perceived. Photographic pictures were made of the whole eye of the pig by means of Röntgen rays, when no shadow was cast by the lens, so that apparently it does not completely choke the passage of the rays;[1] they are absorbed by the vitreous humour to some extent, to a less degree by the cornea. As regards the retina, the light sensation perceived cannot be due to the fluorescence of the anterior parts of the eye, because, when the rays were allowed to play upon a part of the lens, etc., only, there was no sensation of light in the corresponding area of the field; that the lens is permeable is shown also by the fact that while the aperture in the metal screen was 4 mm. in diameter only, the lens itself has a diameter of 8 mm. It is suggested as a possibility that the retina becomes fluorescent, and thus stimulates itself. Persistent exposure of the eye of the rabbit during many *séances* to the action of the Röntgen rays was found to produce effects upon skin, cornea, and conjunctiva very similar to those of a powerful chemical irritant, such as ammonia; the hair was destroyed, the cornea acquired a dense nebula; there was great discharge from the conjunctiva with loss of substance, and symblepharon was established. The author failed to discover fluorescence of the cornea, etc., at all; and from his own experiments, and those of others, he arrives at the following conclusions, amongst others:—(1) That the irritation produced by the Röntgen rays upon the anterior parts of the eye is yet another point of resemblance between these rays and the ultra-violet. (2) That Röntgen rays are absorbed by all the media of the eye, slightly by the cornea, more by the lens and vitreous humour. (3) That their action on the posterior parts of the eye is still undetermined. (4) That the fluorescence which Widmark regarded as a means of protection of the deeper parts of the eye, from their noxious influence in the case of the ultra-violet rays, is not observed in the case of the Röntgen rays. (5) That the action of the Röntgen rays is primarily of a chemical nature, perhaps also in a secondary degree tropho-neurotic.—*Centrabl. f. prakt. Augenh.*, Leipzig, Aug. and Sept. 1897.

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[1] See also *Edin. Med. Journ.*, 1897, vol. i. p. 674.

REPORTS OF THE MEDICAL SOCIETIES.

Edinburgh Medico-Chirurgical Society.—*2nd February* 1898.—Dr. **Joseph Bell**, Vice-President, in the chair.—Dr. **Allan Jamieson** showed—(1) A case of favus cured by sulphur and pix liquida; (2) a case of syphilis with peculiar pigmentary developments. Dr. **Norman Walker** showed—(1) A case of lichen planus; (2) a case of syphilis. Dr. **Gibson** showed a specimen of tricuspid and mitral stenosis. Dr. H. **Littlejohn** showed—(1) Specimen from a case of dislocation of the third and fourth cervical vertebræ; (2) specimen from a case of cut throat in which the dura mater of the spinal canal had been injured; (3) the stomach and œsophagus from a case of carbolic acid poisoning. Dr. W. **Russell** showed—(1) The heart from a case of acute endocarditis; (2) perforated gastric ulcer. Mr. **Cotterill** showed—(1) A large oxalate of lime calculus, which gave rise to very few symptoms; (2) a specimen of Meckel's diverticulum, which caused intestinal obstruction.

Dr. **Dawson Turner** then read a paper on "The Localisation of Foreign Bodies by means of the Röntgen Rays." He described the method used by Dr. Mackenzie Davidson. This consists in taking two photographs on one plate—the first being taken, the tube is moved horizontally a certain distance, and the second taken. A line is drawn from the first position of the tube to the first shadow, and a second from the second position to the second shadow. The point where these cross gives the position of the foreign body. Dr. Turner adopts a similar method, but uses three measurements—(*a*) The distance of the tube from the plate; (*b*) lateral displacement of the tube; (*c*) distance between the images on the plate. The unknown distance (x) of the body from the plate is obtained by the following formula:—$x = \frac{a \times c}{b + c}$. Dr. Turner also showed an adjustable focus tube, in which the one pole could be made to approach or move away from the other by means of an electro-magnet.

Edinburgh Obstetrical Society.—*Wednesday, 9th February.*—The President, Dr. **Halliday Croom**, in the chair.

Specimens were shown by the **President**, Professor **Simpson**, Dr. **Ballantyne**, Dr. **Church**, and Dr. **Angus Macdonald** for Dr. **Brewis**.

Communications.—The **President** read a paper on "Senile Uterine Catarrh." At the outset he remarked that the subject was an important one, and that a due appreciation of it would save many women from the risks of vaginal hysterectomy. He recorded three cases, one to illustrate each of the three types of the disease which were met with. In his experience these were—(1) Those in which the discharge was muco-purulent and offensive; (2) those in which the discharge was frequently blood-stained; and (3) those in which hæmorrhage was the most marked, if not the only local symptom. In all cases there was also marked emaciation, and even cachexia, with progressive invalidism. With regard to treatment, he found the best results from rest, hot douching, the application of escharotics to the cavity of the uterus, and occasionally from curettage, while arsenic and strophanthus should be administered internally.

Dr. **Fordyce** read a communication on "Intra-uterine Typhoid Fever." He saw a woman, aborting at the fifth month, *in articulo mortis* from typhoid fever. He hastened delivery by turning, but the woman died eighteen hours after. The fœtus had obviously been alive up to the time of labour. On careful dissection, no lesions indicating typhoid were found; but from the spleen, intestines, kidney, and placenta pure cultures of Eberth's bacillus were got. The blood serum and a small quantity of serum from the peritoneal cavity gave Widal's agglutinative test very characteristically. The bacilli were not found in the tissues on microscopical examination. All the bacteriological experiments were carried out most carefully, to avoid all possibility of error. He concluded his paper with a discussion on the passage of bacteria through the placenta from the maternal to the fœtal blood.

Royal Medical Society.—*14th January* 1898.—Dr. T. A. Ross in the chair.—Dr. G. L. **Chiene** gave a dissertation on the "Surgery of the Lung." The circumstances under which surgical interference could now be resorted to were for abscess, for bronchiectasis where there was only a single cavity, and for localised gangrene. When the surface of the parietal pleura had been reached, the surgeon had to decide whether it was adherent to the visceral layer or not. If no adhesions existed, they had to be created before the operation could be proceeded with. Various methods had been adopted, such as a continuous circular deep suture, but they admitted the entrance of air. To obviate this difficulty, Dr. Chiene recommended keeping the two layers adherent by suction, and the production of the adhesions by the injection of an irritant.

Dr. **Cooper** made a communication on the value of Walcher's position in midwifery. The increase in the diameters at the brim caused by the adoption of this position had relieved the impaction in two cases in which he had adopted it.

Dr. T. A. Ross showed a specimen of mitral and tricuspid stenosis, and described the case from which it was obtained.

21st January 1898.—Dr. A. H. **Ballantyne** in the chair.—Dr. **Alexander James** delivered a lecture on "The Causation of Disease." He considered cell life. Metabolic activity was much greater during early life and diminished as age advanced. Malignant tumours were the result of adult tissues taking on the metabolic activity of the embryo; Cohnheim's theory was, that it was the result of embryonic rudiments which remained in the tissues. Probably, however, any tissue was capable of becoming a tumour, the causation of tumour growth being impaired nutritive power.

Mr. D. **Wardrope** gave a communication on a case of atresia ani simplex.

Mr. A. **M'Intosh** described the case of a lad, æt. 17, who had suffered from fracture of both bones of the lower third of the leg, which was followed by gangrene. Amputation was successfully performed.

28th January 1898.—Dr. G. L. **Chiene** in the chair.—Dr. **Hope Fowler** showed a child, æt. 8, with double untreated subluxation of the heads of both radii. The arms were in the prone position. There was no power of supination.

Mr. R. F. M'Nair Scott gave a communication on "Some Notes of the Surgical Out-Patients at the Sick Children's Hospital." He discussed some of the diseases due to parasites, and those which were due to hypertrophies. In all cases of dry caries, psoas abscesses should be examined for carefully, as they might be present without the usual symptoms.

Mr. Henry Wade gave a communication on a case of retroperitoneal sarcoma, causing complete obliteration of the inferior vena cava, in a man æt. 61, who had been troubled with dyspeptic symptoms and a gradually enlarging abdomen, with dilated superficial veins, which carried on the compensatory circulation. Examination revealed a resistant mass in the right lumbar region. The post-mortem specimens and sections of the tumour—a large spindle-celled sarcoma—were shown by Mr. Wade.

4th February.—Dr. E. E. Porritt in the chair.—Mr. Henry Wade showed an old print of a double monster—a case of thoracopagus parasiticus.

Dr. Armour gave a communication on a case which presented considerable difficulty in diagnosis, but was probably a tumour of the pancreas. Salol was administered as a diagnostic, and no carbolic acid was eliminated in the urine. He also read a case of movable kidney.

Dr. A. H. Ballantyne gave a communication on the case of a woman, æt. 30, who suffered from dizziness and sickness, followed by unconsciousness. When consciousness returned she was noticed to be suffering from aphasia and hemiplegia. On the second day abortion occurred. Power of motion and speech are gradually returning.

Dr. Goldie gave a communication on vaginal hysterectomy. He described the various conditions in which this operation is performed, and gave a demonstration of the instruments used in, and the various specimens obtained by, this operation.

11th February.—Dr. T. A. Ross in the chair.—Dr. Struthers showed a man with locomotor ataxy, following specific infection, and tabetic club-foot. The condition had come on rapidly after a slight injury. The swelling implicated the tarsal bones, with the exception of the astragalus and os calcis. It was painless to touch. The Argyll Robertson pupil was present.

Mr. F. S. L. Rose gave a communication on "Infantile Diarrhœa," and described a number of cases. In those fed on artificial foods this condition occurred with much greater severity. The composition of the fæces depended on the bacteria swallowed. Hand-feeding with cow's milk was a very frequent cause of this condition, especially in summer, the decomposition products or ptomaines producing intestinal catarrh. The great prophylactic was feeding with breast milk from a healthy mother.

Glasgow Pathological and Clinical Society.—*7th February* 1898.—Dr. Donald Fraser (Paisley) in the chair.—Dr. R. M. Buchanan showed specimens of anthomyia canicularis and acarus folliculorum. The occurrence of anthomyiæ larvæ in the human subject is rare, and is frequently overlooked. According to Küchenmeister, there are 200 species in Europe. The eggs are deposited in decomposing matter; the mature form frequently appears in flowers, and is recognised by its maggot form, dorsal spines, and stalked breathing tubes. The patient from whom the specimens were obtained was a man of intemperate habits. While under the influence of liquor he ate all manner of garbage. No symptoms could be ascribed to the presence of the larvæ. They have been known to pass into the bowel when at stool. The ordinary town closet was frequently used by this man, but his mode of living might have had something to do with their presence. The specimens of acari were obtained from a child, who was brought to the dispensary on account of an eruption in the chest, neck, and temporal region. Dr. Buchanan finds it difficult to accept the statement that the parasite is of no pathological significance whatever. Its effects are seen in the lower animals in definite lesions. In the dog it produces mange, and hides are frequently valueless on account of deep pits produced by aggregations of this parasite.

Mr. **Maylard** showed a specimen of adherent coils of intestine from a case of strangulated hernia. The hernia was cut down upon and reduced. The obstruction was relieved, the bowels moving freely after the operation. Some days after, broncho-pneumonia developed, and the patient died. It was found that the strangulated portion formed part of a mass where three separate coils of intestine were glued together, but not sufficient to give rise to symptoms of obstruction.

Dr. **Workman** showed and described the following specimens:—

(*a*) A sarcoma from the neighbourhood of the pancreas, with secondary disease of the liver, in a child æt. 4, with jaundice of eleven weeks' duration, and pain in the epigastric region. Distinct alcoholic history, the mother giving sips of spirit to the child for three months, with suspicion of its administration for some time previously. The liver was greatly enlarged, and smooth in outline. No ascites; no œdema. At the post-mortem the tumour was found to have originated in the neighbourhood of the pancreas, and to have secondarily involved the liver, mostly along the borders, which had a remarkably frilled appearance. Dr. Workman inclined to the view that the tumour had originated in a lymphatic gland, as it resembled a mediastinal gland tumour, and was an alveolar sarcoma. (*b*) Masses of a straw-like character from the stomach and intestine of a girl, æt. 19. There was nothing in the history suggesting its existence. Evidence of diffuse general peritonitis, due to a perforation of the ileum, was found. The stomach was much distended with gas, and contained a quantity of straw-like material, 11½ oz. in weight, and rolled into the shape of the stomach cavity. This had probably been formed by the patient swallowing small quantities of the material from time to time.

Dr. T. K. **Monro** showed the temperature chart from the following case:—Acute rheumatic polyarthritis, pneumonia, hyperpyrexia. Treatment by cool baths, and afterwards by continuous warm bath. Recovery; slight bilateral ulnar neuritis.

Dr. **Joshua Ferguson** showed a specimen of cerebellar hæmorrhage from a case of sudden death. The head was alone examined. There was distinct evidence of aneurysmal dilatation of the posterior-inferior cerebellar artery.

Forfarshire Medical Association.—This society met on *4th February* in the University College, Dundee, Dr. **Alexander Campbell**, President, in the chair. Dr. **Don** showed a lad with a peculiar eruption over the thigh and leg, following the distribution of the cutaneous branches of the sciatic and the musculo-cutaneous. There were crops of papules, with marked pigmentation and itchiness.

Dr. **Mackie Whyte** showed two hearts, the one with clots in superior vena cava and left subclavian vein, the other with a large left auricle.

Dr. **Guild** read a paper on nasal obstruction, showing that nasal obstruction affected the upper part of the respiratory system, and that hypertrophy of adenoid tissue would recur after removal, if an anterior cause of obstruction were not removed. The symptoms produced depend on the amount of obstruction, and on constitutional peculiarities. He described the symptoms produced by different causes of nasal obstruction, as well as indications for treatment, which depend on the symptoms and occupation of the individual. Removal of the cause is indicated in all cases where there is any deafness from implication of the Eustachian tubes, chronic bronchial or asthmatic symptoms.

He advocated cocaine and the electric cautery as most efficient in treatment. The object of treatment is to obtain painlessly the maximum amount of relief with a minimum amount of destruction of tissue.

Dr. **MacVicar** read a case of visual aphasia and amnesia verbalis in a young man, whose head struck the edge of a dresser on the right parietal eminence. After recovery from this, he was unable to read, but gradually improved, and was able to read aloud and write to dictation short words before he could recognise letters. He understood written speech subsequent to being able to read aloud. He could read simple sentences in fourteen days, and numerals in nineteen days, after the injury. The lesion was supposed to be of the nature of a hæmorrhage, due to contre-coup over the left angular gyrus, and possibly affecting the supramarginal and posterior part of the third temporo-sphenoidal convolutions.

Dr. **Kynoch** read notes on a case of labour complicated by ovarian tumour, subsequently removed by operation. Reference was made to the treatment of this complication during pregnancy and labour. Ovariotomy was performed a few months after the last confinement, the tumour proving to be a dermoid cyst.

Dr. **Mackie Whyte** showed a case of congenital diplegia, and gave notes of the case. It was that of a man æt. 48, and 4 ft. 5 in. in height. The trunk is short, measuring 21 in. from the top of the sternum to symphysis pubis; 34½ in. round the chest. The ribs on both sides are close to the iliac crest. The patient is unable to feed himself. The movements of the arm are chiefly adduction of arms across the body, at the shoulder-joint. The arms are small, are both rotated inwards, and the hands are in a state of pronation—the backs look downwards in erect posture, the thumbs lie across the palms. The lower extremities are poorly developed; the feet are in position of talipes equino-varus. The joints are all freely movable. There is a scoliosis of the spine, most marked in lower dorsal vertebræ. The patient is quite intelligent. Dr. Whyte stated that Dr. Sarah Macnutt had shown a meningeal hæmorrhage at birth to be the cause of this disease.

OBITUARY.

EDUARD RITTER V. HOFMANN.

By the death of Professor Hofmann, Vienna lost one of its greatest ornaments, while forensic medicine was deprived of a most distinguished teacher.

Following the footsteps of those classic writers on medical jurisprudence (Orfila, Taylor, Tardieu, and Casper), Hofmann, shortly after succeeding to the Chair of Forensic Medicine in 1875, became one of the foremost authorities on the subject; by his writings, as well as by the scientific methods he brought to bear upon all questions relating to legal medicine, he gave the Vienna school a reputation in this department of medicine which made it famous in all parts of the world.

There is scarcely a subject comprised within the science of forensic medicine which has not been advanced by Hofmann's investigations, and his Text-Book has long been recognised as the most complete and reliable treatise in the German language.

Soon after his appointment to Vienna he reorganised his department, and, recognising the immense importance of practical teaching, he obtained the privilege of performing all the post-mortem examinations on cases of sudden or violent death, which till then had been carried out by the Professor of Pathology. To listen to his observations and the admirable reports which he dictated to the legal assessor present, according to Austrian procedure, all such post-mortem examinations were an experience which few who have had the opportunity of being present can forget. His lectures were eminently practical, and impressed upon his hearers by illustrative cases drawn from his wide and varied experience; or, if the subject required further elucidation, it was afforded by experiments performed before the class.

Many old accepted views, which had been handed down as axioms from previous authorities, have been swept away under the acute observation and scientific accuracy of Hofmann's investigation; and there can be no question that he, more than any recent medical jurist, has helped to free this important branch of medicine from many of the dogmas which, while generally regarded as unassailable, he yet proved to be inaccurate, and founded upon illogical bases.

JOHN STEWART, M.D.

By the death of Dr. Stewart, in his ninetieth year, a well-known and loved personality of Perth has been removed. After graduating at St. Andrews, he entered the navy as surgeon, and saw much active foreign service. He was one of the survivors of the bombardment of St. Jean d'Acre, and had also passed through the Chinese, New Zealand, and Crimean wars. For his services on these occasions he received medals, as well as the Order of the Medjidie; while, on his retirement from active duty, he became the recipient of a Greenwich Hospital pension.

EDWARD LUND, F.R.C.S.

ALTHOUGH he had for some years ceased to be an active member of the Manchester school, Mr. Lund was held in deservedly high honour as one of the pioneers who raised it to its present high position, and his death severs an important link with the past. His influence was by no means confined to the city of his adoption. Possessed of a singularly fair and open mind, he from the first saw the immense value of Lord Lister's methods, and warmly espoused the cause of modern surgery while it was as yet the object of violent opposition. As Hunterian Professor and Member of Council of the Royal College of Surgeons, Mr. Lund also exerted wide influence, while his own contributions to surgery were of a most comprehensive character.

JULES PÉAN.

THE sudden and premature death of Jules Péan has left a void in the surgical world of Paris. He was without doubt one of the greatest surgeons of the century, and has, by his advances in abdominal surgery, left behind him an imperishable name. His lectures on clinical surgery, consisting of eight volumes, remain a lasting monument to his memory.

MEDICAL NEWS.

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"THE LARYNGOSCOPE."

THE appearance of an English edition of this well-known journal, simultaneously with its publication on the other side of the Atlantic, will be heartily welcomed. The aim of the editors is to place before the profession such a view of the progress of the department of medicine dealing with the nose, throat, and larynx, as to keep it in touch with every recent advance. The *Laryngoscope* will be presided over by Dr. St. Clair Thomson, as representing the specialists in this country.

ANALYTICAL REPORTS.

LIQUOR COLCHICINÆ SALICYLATIS (HOPKINSON).

BAISS BROTHERS & Co., 4 Jewry Street, London, have sent us a sample of their preparation of Liquor Colchicinæ Salicylatis (Hopkinson). The salicylate of colchicina has been known to members of the medical profession for the last few years as a remedy which is frequently successful in the subdual of gouty symptoms and of rheumatic gout, in cases where other medicinal remedies have failed. Colchicum has, no doubt, some specific action upon gouty processes in the body, an action the source of which is as yet quite obscure; but it also labours under the grave disadvantage of frequently causing symptoms of nausea and even gastro-intestinal poisoning, although given in small doses. The chief recommendation of salicylate of colchicina appears to lie in the diminished tendency shown by it to irritate the alimentary mucous membrane. Colchicina itself is a powerful poison,—a third of a grain produces severe and prolonged gastro-intestinal irritation,—but the preparation under notice does not produce such marked symptoms. A teaspoonful of the liquor, it appears, contains $\frac{1}{32}$ gr. of salicylate, and the dose recommended consists of two teaspoonfuls a day, or $\frac{1}{16}$ gr. Patients suffering from gout for whom we have prescribed it have not experienced any discomfort from its use, except in one case where colchicum could not be borne, in which very slight uneasiness was caused. Marked improvement followed its exhibition in all these cases. There can be no doubt about the excellence of the liquor colchicinæ salicylatis as a means of combating many of the otherwise intractable examples of chronic gouty and rheumatic affections met with in practice.

MISTURA BISMUTHI AROMATICA.

THE same firm have sent us a sample of a preparation, termed Mistura Bismuthi Aromatica (Baiss). A teaspoonful of this mixture contains 1½ minims of dilute hydrocyanic acid, $\frac{1}{32}$ gr. of morphine, 6 minims of the tincture of nux vomica, together with bismuth and chloric ether. It has an attractive appearance, owing to its bright, clear red colour, due probably to a trace of cochineal, and is very slightly acid in reaction. No effervescence occurs with addition of an acid, and the bismuth is in all probability present as the subnitrate. The taste is not disagreeable, as the bitter of the nux vomica is largely masked by the spirits of chloroform. A strong point in its favour lies in the addition of the nux vomica to the usual bismuth mixtures, so many forms of dyspepsia arise from causes which may be lessened or removed by the action of strychnine on the nervous system.

"D.C.L." Malt Extract.

Of the makers of malt extracts there is no end. But it is not a thing to be wondered at, when the amount of spare malt from the numerous breweries and distilleries in the land is considered, and the chance afforded them to dispose of a bye-product in a form both profitable and useful. The Distillers' Company Limited of Edinburgh have sent us a specimen of the malt extract made by them from the abundant material available in the ordinary run of their business. The extract possesses a high degree of diastatic power, is free from any addition of cane sugar and from acid, and has a very pleasant flavour. As malt contains soluble proteid, maltose, dextrins, and an appreciable quantity of phosphate, it serves as an article of diet of easy assimilation and digestion, in the ordinary amounts in which it is taken. Children who dislike fats and won't eat enough of them, are very much the better of extra carbohydrate food, and there is no better method of providing this than by giving them treacle or malt extract. The D.C.L. Malt Extract can with confidence be recommended, not only in such cases, but also in other conditions common to mankind where extra fuel and nourishment are required to preserve a healthy body and mind.

Champagne Laurent-Perrier "Sans-Sucre."

The Champagne Sans-Sucre of Laurent-Perrier by now must be so well known that a further encomium on its excellence will scarcely be necessary. A sample recently sent us proved to be a perfect champagne in flavour and bouquet; while, tested with Fehling's solution, no reduction of the copper occurred until after some hours' standing, when a slight trace of a yellowish deposit was found. It is really a wine "sans sucre," for the amount present, about 0·07 per cent., is practically of no account. It is, notwithstanding, a champagne of the highest quality, far removed from the ordinary invalid brands, and must not be regarded as a medicinal wine in any way, but as a first-class wine of the best kind, only absolutely "dry." In its manufacture the process of fermentation of the juice appears to take place very largely in the bottle and on the pure juice of the grape, no sugar being added, but the fermentation is complete. We know of no wine which suits the gouty, the rheumatic, or the dyspeptic so well as the Champagne Laurent-Perrier "Sans-Sucre."

MONTHLY NOTES
ON METEOROLOGY AND VITAL STATISTICS.

By A. LOCKHART GILLESPIE, M.D., F.R.S.E., F.R.C.P.Ed.,
MEMBER SCOTTISH METEOROLOGICAL SOCIETY.

METEOROLOGICAL MEANS FOR THE EAST OF SCOTLAND DISTRICT, FOR THE FOUR WEEKS ENDING JANUARY 29.

	Temperature.			Rainfall in Inches.		Sunshine. Hours.		Mean Daily Variability of Temperature.
	Mean.	Accumulated Day-Degrees.		Actual.	Accumulated from Jan. 2.	Actual.	Accumulated from Jan. 2.	
		Above 42°.	Below 42°.					
Mean	36°·4	^{*1} 25° ^{2} 25°	162° 162°	2·75	2·75	36·0	36·0	3°·15
Observed	42°·7	^{1} 92° ^{2} 92°	58° 58°	1·2	1·2	26·0	26·0	2°·62
Difference	+6°·3	^{1} +67° ^{2} +67°	104° 104°	−1·55	−1·55	−10·0	−10·0	0°·53

VITAL STATISTICS.

MORTALITY IN FOUR LARGE TOWNS IN THE EAST OF SCOTLAND, DURING JANUARY.
Actual Numbers and Rate per 10,000 per annum.

	Total.		Constitutional Diseases.		Circulatory System.		Nervous System.		Respiratory System.	
	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.
Deaths expected and Mean Rate for 1891–1896	1,281	227·1	205	36·4	118	20·9	139	24·6	305	54·0
Actual Deaths and Rate per 10,000	1,081	191·3	222	39·4	103	18·2	137	24·3	245	43·3
Difference from Mean	−200	−35·8	+17	+3	−15	−2·7	−2	−0·3	−60	−10·7

	Digestive System.		Urinary System.		Pneumonia.		Phthisis.		Cancer.	
	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.
Deaths expected and Mean Rate for 1891–1896	73	13·0	26	4·5	98	17·4	101	18·0	47	8·3
Actual Deaths and Rate per 10,000	81	14·4	27	4·6	105	18·6	106	18·8	54	9·5
Difference from Mean	+ 8	+1·4	+ 1	+0·1	+ 7	+1·2	+ 5	+0·8	+7	+1·2

* NOTE.—The figures ^{1} denotes the data for January, ^{2} for year to date.

The population of Edinburgh, Leith, Dundee, and Aberdeen is estimated to the middle of 1898 at 676, 861, or 8076 over the figure for 1897, an increase of 1·2 per cent.

The mean temperature for January was remarkably high, exceeding, indeed, all previous records, and reached as much as 6°·3 in excess of the average. Neither at Edinburgh nor at Leith did the sheltered thermometer fall below the freezing point during this period. The accumulated warmth was 67 day degrees above 42° in excess, the cold 104 day degrees in defect. Only 43 per cent. of the average amount of rain fell, while the hours of bright sunshine were rather deficient. The high temperature was due to the unusual persistence of westerly and south-westerly currents of wind, the great distance to the north of our shores of the centres of the cyclonic disturbances causing these currents to precipitate a smaller rainfall than is usual under such conditions.

The total number of deaths from all causes was much below the average, and this decrease was most marked in deaths from respiratory and circulatory disorders. With the exception of a slight decrease under the nervous system, the other systems and diseases noted here showed a small increase. Notwithstanding the warmth, deaths from pneumonia were slightly in excess of the average. Eight deaths occurred from influenza, seven of them in Edinburgh.

In January, therefore, characterised by most unusual warmth, dryness, and westerly winds, the number of deaths was fewer, owing especially to the diminution of deaths from respiratory diseases, although those caused by pneumonia were rather over the average.

EDINBURGH MEDICAL JOURNAL.

ORIGINAL COMMUNICATIONS.

PLEURAL EFFUSION.

By T. Lauder Brunton, M.D., LL.D., F.R.S., F.R.C.P., *Physician, St. Bartholomew's Hospital, London.*

(*A Lecture delivered at St. Bartholomew's Hospital.*)

We have had in the wards lately a large number of cases of pleural effusion. I have before me the notes of no less than sixteen cases. It is obvious that I cannot enter into the details of all these, but can only take from them such points as I think may be useful and interesting to you.

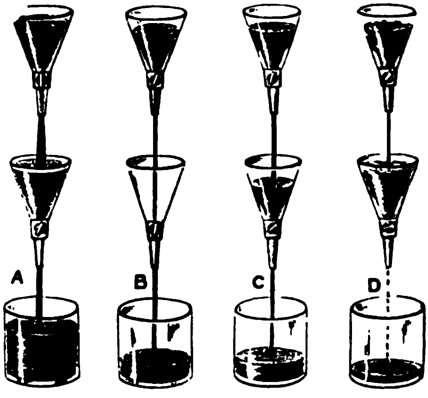


Fig. 1.

It is always advisable, I think, to trace symptoms back as far as we can to their cause, and find out why a given occurrence takes place. A collection in the pleural cavity occurs just as a collection of fluid does elsewhere, for the very simple reason that more fluid is poured into it than passes out from it in a given time (Fig. 1, D). If a quantity of liquid be poured into a funnel, care being taken not to pour it in more quickly than it can run out, no fluid will accumulate (B); but if the fluid be poured in more quickly than it can run out (A), or if the rate at which the fluid can run out be lessened, accumulation will occur. An accumulation of fluid in a serous sac, such as the pleural cavity, may take place, either by an increase of the rapidity with which fluid is poured in, or a decrease of the rapidity with which fluid is absorbed, or by both at the same time (Fig. 2).

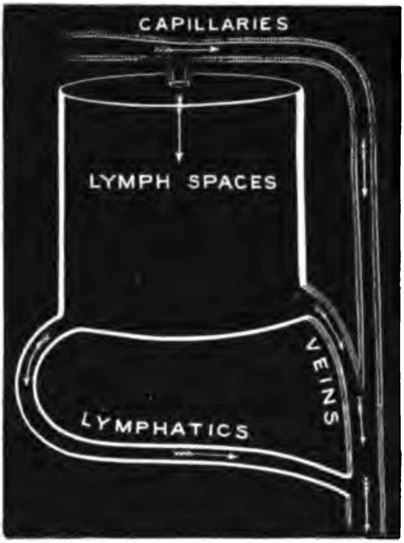


FIG. 2.—Diagram of the relations of lymph spaces and blood vessels.

Now, as you know, the pleural cavity in healthy men is not a cavity at all. It is called a cavity, because it can be made into one, but it is not a cavity in the ordinary sense of the word, for the costal and the visceral pleuræ come close together without leaving any space between them. Their surfaces are kept moist by a certain amount of serous fluid. In order to keep this serous fluid fresh, a little is poured out and a little is absorbed regularly; so that, although there is only a very small quantity, just enough to moisten the surface of the pleuræ, yet this is constantly renewed. The way in which it is renewed is this: The lymphatics take up from the pleuræ the fluid which is poured into them from the blood vessels. The lymphatics are perhaps more easily shown in the central tendon of the diaphragm than they are anywhere else; and a beautiful injection of the lymphatics in the central tendon of the diaphragm may be obtained by taking a dead rabbit, cutting it across about the middle of the abdomen, and suspending the upper part of the body in the way you see here, so that the diaphragm forms a sort of hollow cup, with its concavity directed upwards. Then, if some Berlin blue be poured in, and the movements of artificial respiration be kept up in the lungs, so that the diaphragm is kept constantly moving up and down for two or three hours, the Berlin blue becomes taken up, and passes into the lymph spaces;

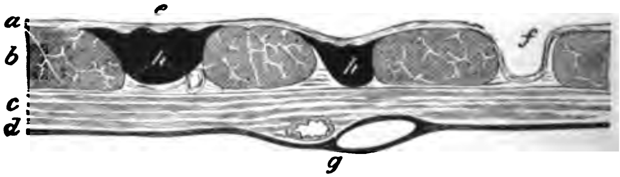


FIG. 3.—Section of the central tendon of the diaphragm in the rabbit. *a*, peritoneum; *b*, tendinous fibres in cross-section; *c*, circular fibres; *d*, the pleura; *e*, peritoneum stretched over a full lymph space; *f*, peritoneum lying in an empty lymph space; *g*, blood vessels.—After Ludwig and Schweigger-Seidel.

so that a most lovely injection is frequently obtained. Our experiment this morning has not succeeded so well as many that I have tried; but you can see that some of the Berlin blue has been taken up. There may not unfrequently be seen in the central tendon a most lovely radiating structure, the blue representing the lymph channels; and it has been found that in the diaphragm there are certain stomata, or openings, very much resembling those found on the under surface of leaves (Fig. 4). Through these stomata the particles of Berlin blue are taken up, and the use of these particles is to show where the fluid is gone; without their presence we could not trace the fluid. By the same means we are able to trace the passage of fluids from the pleural cavity into the lymphatics, and it has been shown (Fig. 5) that in the interspaces between the ribs, on the inner side of the thoracic wall, the lymphatics are to be found in great abundance. And if a section be made of the pleura, the lymphatic spaces are seen to present very much the appearance which I show you in the diagram (Fig. 6). These lymph spaces are kept in a state of movement during ordinary respiration, and every breath that is drawn has a pumping action upon the pleura; so that the more a man breathes, and the more the fluid is poured out to keep the lungs well lubricated, the more rapidly is the fluid pumped up from the pleura into the lymphatics of the chest and so into the general circulation. Perhaps this fact does not bear so much upon the cases that we are going to deal with first; but it does bear to a very great extent upon one of the cases at least that we shall have to take into consideration later on, namely, the effusion of fluid into the pleural cavity in the later stages of heart disease.

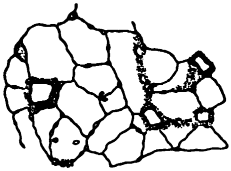


FIG. 4. — Epithelium of diaphragm, showing stomata.—After Ludwig and Dybkowsky.

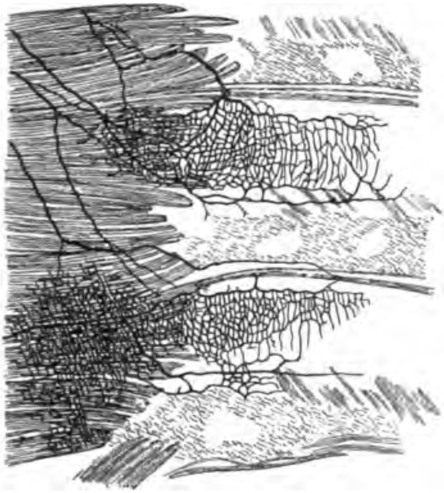


FIG. 5. — Injected lymphatic network over the sternocostal and intercostal muscles of a dog. (Nat. size.)—After Ludwig and Dybkowsky.

Now, in ordinary acute pleurisy, it would appear that the cause of the effusion is rather that fluid is more quickly effused than that absorption is diminished. In order to understand how this effusion of fluid takes place, we have to take into consideration the blood vessels from which the fluid passes out. You know that the capillaries consist of numerous cells, closely applied to one another so as to form a complete ring. These cells, however, have been stated to consist of two parts. A sort of ground substance is said to lie next to the lumen of the capillary; and the cells, when the capillaries are not dilated, are in constant contact with one another; but if the capillaries are dilated, they are drawn apart from one another; so that one can readily see why fluid should pass out quite easily from a dilated capillary. In fact, the puzzle is, if the capillaries are dilated, and the edges of the endothelial cells are drawn apart, why does not the whole of the liquid in the capillaries leak out? The reason alleged is that the outer part of the cell consists of protoplasm, and while the inner part of the cell may be drawn apart from its neighbouring cell, leaving a gap between, the protoplasm, being elastic, tends to stretch; so that a layer of protoplasm renders the wall of the capillary still continuous even during dilatation. We have, however, a difference in filtration through the capillary wall when it is in a state of contraction, and when it is in a state of dilatation. In contraction, we have a double layer of substances, the ground substance and the protoplasm in the capillary wall, through which the fluid must filter before it can get into the tissues below. But, in the state of dilatation, we have only got the protoplasmic layer acting as a filter; and therefore, as we can well imagine, not only is there likely to be a difference in the *quantity* of the fluid effused, but there is also likely to be a difference in the *quality* of the fluid effused from the capillaries into the tissues. Now, as you all know, one of the first circumstances that occur when the pleura is inflamed is that the capillaries become dilated; so that, if the pleura be examined shortly after an irritant has been applied—and this can be done readily in the case of experiments on animals—it is found that the capillaries are much dilated, and that the pleura itself assumes a much more ruddy colour than in the normal condition. At the same time, it loses its smooth polished surface

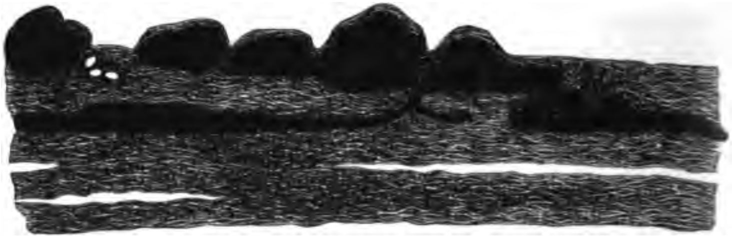


Fig. 6.—Section of the intercostal pleura (300 diameters). The injected lymph spaces appear black in the figure.—After Ludwig and Dybkowsky.

and becomes slightly rougher, so as to present an appearance, not like a piece of ordinary window glass, but rather like a piece of frosted glass, or glass upon which one has breathed. This process may not go on any further, and a retrogression may occur; so that the pleura may again return to its former condition without anything more happening. On the other hand, however, you may get the two surfaces of the pleuræ becoming adherent without the effusion of any liquid; but in many cases liquid becomes effused, sometimes to a very considerable extent. The liquid frequently is serous, and generally contains fibrin also. The amount of fibrin varies in different cases; sometimes it is very considerable, in other cases it is only slight. This fibrin, however, is frequently deposited upon the surfaces of the pleuræ, giving rise to a thick, rough, membranous-looking substance; and by and by, after the fluid has been absorbed, you may get a large thickened mass of fibrin between the two layers of the pleuræ, and in the interstices of this a quantity of fluid is frequently enclosed.

Now, one of the first causes of pleurisy may be injury to the side; a blow, or something of that sort. In one case we had in Hospital, there was a certain suspicion of a blow having originated the pleurisy, although it was properly aided by the effect of a chill. In many other cases, however, we find that a chill gives rise to the pleurisy, and we are not able, in some of those cases at least, to trace the presence of any other factor.

Many means have been tried of late years to find out the presence of microbes in addition to the chill; for the presence of pleurisy has been looked upon as due to the microbes finding their way into the chest, and having their vitality increased, or rather, perhaps I should say, their power for mischief increased, by the vitality of the tissues of the pleura being lessened by exposure. I do not think, however, that this has certainly been proved, and I think in the meantime we may assume that pleurisy may be due simply to the effect of chill. The place where the chill is very likely to take effect is just the place where you would naturally imagine it, namely, that part of the chest that is not well covered by muscle, just between the latissimus dorsi in the back and the pectoral muscles in front. A chill may take effect much more readily here than in those parts which are better covered.

The symptoms that we get after exposure are that the man gets a rigor, or shiver, but instead of my detailing the symptoms to you in a general way, I may perhaps simply read a case to you, because I think you will find the symptoms all beautifully given in it. We will take the case, for example, of John R. He was admitted on 19th February 1896; his age was 35, and he was a furniture porter. The history of the case is, that he was well till fourteen days before admission; then one day, while at his work lifting furniture, he became very hot. When he got home he felt very chilly and began to shiver, but there was no very distinct rigor. The same evening he was seized with pain in the right side, and a cough. The pain was very much worse whenever he took a breath, or when he coughed. Notwithstanding this pain and the cough, he continued to work for two days, and then he stayed at home for five or six days, not going to bed, but simply sitting about the house; and he attended at the surgery here for a week. The pain which seized him so violently at first had almost gone for the last three or four days before admission. When he was admitted, his respirations were 36. He lay upon the right side, the side in which he had had pain, but from which the pain had now gone. He had a troublesome cough, but no expectoration. On examination of the chest, the movements of the right side were deficient; the vocal vibration was nearly absent, and, behind, the vibration was absent also. The breath sounds were very much weaker on the right side; there was slight bronchial breathing at the angle of the right scapula. The percussion note was nowhere resonant, and there was absolute dulness all over the region below the third rib in front, and below the spine of the scapula behind. The pulse was 100 and regular, the apex beat was in the fifth space; but whereas it ought to have been about half an inch to the inside of the nipple line, it was in the nipple line; it was therefore displaced outwards. I should also mention that ægophony was found opposite to the angle of the scapula on the right side.

In this case, then, we had a history of pleurisy. There was the cough, the pain in the side, and also the raised temperature. The pain had disappeared, and we found on admission dulness on percussion—dulness of an absolute nature—over a great part of the right side; the breath sounds almost absent, and the vocal fremitus almost, or entirely gone. These, then, were the signs of pleural effusion. The disappearance of pain pointed to effusion, for at the beginning of the disease the two surfaces of the pleuræ had rubbed against one another, giving rise to pain, but as the fluid became effused and the surfaces became separated from one another, so that there was no longer any friction, the pain had gone. An exploring needle was inserted in the post-axillary line, in the seventh space on the right side; clear fluid was drawn off, and so an aspirating needle was put in at the same spot, and 13 oz. of slightly opalescent fluid were removed. After the removal of this quantity of fluid, the dulness quite disappeared, the voice and breath sounds came back, and the vocal vibrations could again be felt all over the right side; the temperature still remained up, but the respiration went down to 18, and both sides of the chest moved well. No evidence of reaccumulation occurred, and the man was discharged on April 22, quite well. After the fluid had been removed there was a certain amount of impairment of percussion over the side of the chest, and there was also a slight increase in the vocal resonance, and the breath sounds were of a slightly bronchial character. The reason of that simply was this, that probably the pleura was still somewhat thickened, and that the lung had not quite recovered its normal elasticity, or its normal spongy character, after the compression to which it had been subjected. In this case, then, we get an example of the signs of pleural effusion and the clearing up of the effusion after the great portion of the liquid had been removed by aspiration.

In another case, that of Walter E., we have also a typical example of pleurisy with effusion, but here there were one or two points that might be interesting to notice. He was well till 5th March; then he got pain on respiration; he was short of breath. On 9th March he went to bed, and he was admitted on 12th March with respiration, 32; pulse, 96; temperature, 99°. All over the front of the chest could be noted a rough friction sound, and what was also more interesting was, that over an area stretching about an inch and a half to the right of the sternum, a rough to-and-fro friction could be heard with every beat of the heart. So that at first sight it might have seemed as if the man had pericarditis as well; but when the lung diminished in size during expiration, this friction completely disappeared, again commencing at the beginning of inspiration. The reason simply was, as you can readily understand, that as the lung with its roughened pleura came across the heart during inspiration, the heart caused a rubbing on the pleura, and so gave rise to the rough to-and-fro friction. Sometimes it is rather difficult to make certain as to whether these frictions are pleural or pericardial, but if that friction had been pericardial, it would have continued whether the lung were inflated or not. In this case aspiration removed 3½ pints of clear fluid, and as the side still remained dull after this quantity had been taken away, the chest was again tapped, and rather more than 3½ pints were removed; so that, altogether, 7½ pints were removed from the chest.

Then we have got one case to which I may refer, of empyema, in which a child æt. 22 months was admitted into "Elizabeth" Ward, and in this case the whole of the chest on the left side was completely dull. But not only was there dulness over the whole of the left side, there was a dulness where no dulness ought to have been—a dulness extending not quite to the right nipple, but still quite to the parasternal line. In this case the heart had been displaced very considerably to the right. An exploring needle showed that pus was present, and as pus is not readily removed by simple aspiration, especially in children, in whom the intercostal spaces are so small, a part of the rib was excised, and 16 oz. of pus were removed, which is a considerable quantity for a child 22 months old. A drainage tube was then put in. The child did very well, excepting now and again when the exit of pus seemed to be interfered with, and then the temperature rose at once; but whenever the pus got free exit again, the temperature came down. It would seem from this case that pus, if retained at all, has the power of raising the temperature to an extraordinary extent. What the exact constituent of the pus is, I do not think we know at present, but there can be little or no doubt that pus does raise the temperature. The opening in the chest wall gradually healed up, and the child, which was admitted on 14th November with this large amount of pus in the chest, was dismissed on 27th January quite well.

In another case of empyema we found that, instead of our having to empty the chest artificially, the chest had emptied itself, because in the case of Edward B., æt. 35, he brought up nearly a quart of pus on 12th April, about a fortnight before admission. On admission, there was dulness over a considerable area in front; the dulness reached to about the same height behind, and I thought very likely that some pus was still present, but on putting in an exploring needle no pus was to be found. Probably there was no longer any free pus present, but only thickened pleuræ with thick fibrous adhesions, and although there might be a little pus in the interstices of the fibrinous matters, yet no pus was free, and none could be removed.

Then there was another case of a boy, æt. 8, who on 7th April got his feet wet and had a rigor. On 15th May he brought up a pint of pus, and on the 16th he brought up a cupful more. There was no definite sign at all in this boy's lung, excepting that there seemed to be a little dulness just below the angle of the right scapula. I thought possibly there might still be some pus there. A needle was put in, but nothing came out, and we have not been able to find any indications of any pus remaining behind, so that in this case the empyema seems to have cured itself by the whole of the pus being ejected through the lung. Then we have some other cases in which the effusion into the pleural cavity has not come on in healthy individuals as in those already discussed, but in persons suffering from other diseases. In the case of Edward S., salesman, the pleural effusion came on in the course of cirrhosis. He had been subject to a cough during the winter for several years. Three weeks before admission he got a pain in the left breast, and the pain was much worse whenever he coughed. On examining the chest, it was found that there was dulness at the left back up to the sixth rib. There was no cardiac murmur, but the liver was enlarged, firm and hard, and there was a cloud of albumin in the urine. He was admitted on 19th March, and on 20th March the pleural cavity was aspirated, and 31 oz. of serum were drawn off. This eased the condition to a certain extent, but it did not cure him in the same way it cured the others, in whom the disease was uncomplicated. More œdema of the legs set in, the surfaces became cold; there was some cyanosis, and on 3rd April the patient died; death being caused, not by the pleural effusion, but by the dropsy due to the liver and to the condition of the kidneys, as well as to a feeble heart.

In the last case that I shall take up to-day, the effusion into the pleura occurred as a complication of heart disease. This is the case of Daniel M. He had a double aortic murmur, and also mitral regurgitation. He had been well until the beginning of March, when his feet began to swell. He then got shortness of breath, and went steadily downhill. He had a large amount of dropsy in the legs, and no less than 32 oz. of fluid were removed from the legs by the introduction of Southey's trocars. This eased him a good deal, but he went on getting worse, and finally died. On post-mortem it was found that there was a good deal of fluid in the chest, and this leads one to note that not unfrequently, on post-mortem examinations, fluid is found in the chest when no fluid is noted as having been present during life. Now, you can readily see why this should be the case. A patient is dying of heart disease, and you find that, in spite of everything that you can do for him, he seems to be steadily getting worse and worse. You do not feel inclined to trouble him very much by making him sit up, so that you may auscultate and percuss the back. Moreover, in private practice more especially, you may find that not only are you unwilling, but the patient himself objects and the friends object; and they say, "The doctor is making the patient sit up and doing him harm, simply for the purpose of satisfying his own curiosity." There is therefore a great temptation to allow the patients to lie quiet and not disturb them when they are dying of heart disease; and yet perhaps, in many instances, we ought to make them sit up, or at least to lie round on the side; so that one could examine the chest, because even although one might not be able to save them, one might be able to prolong their lives by aspirating the chest and removing the fluid which was accumulating.

I mentioned at the beginning of my lecture that the bearing of the experiment that I wanted to show you upon the accumulation of fluid in the pleural cavity had more to do with the accumulation consequent on heart disease, than on the accumulation which occurs after an acute attack of pleurisy. For you can easily understand that if you have got a heart failing, the valves of the right ventricle becoming incompetent, and backward pressure upon the capillaries everywhere, you are likely to get an accumulation of fluid, not only in the lungs, but in the pleural cavity. You are likely to get a larger secretion of fluid, and at the same time a smaller absorption of fluid. Moreover, the very illness of the patient which makes him lie quiet on his back, preventing him from breathing deeply, tends to stop those very movements of the chest wall, which, as Ludwig and Dybkowsky have shown, tend to cause an aspiration of liquid from the pleural cavity; and in this way you are apt to have the last stages of heart disease accompanied by effusion into the pleural cavity. In another case that occurred in "Elizabeth" Ward, there was a small quantity of fluid effusion from the left chest. This also tends to show that one must be very careful in examining, as far as possible, the chest in cases of heart disease. You will remember that in most of the text-books it is stated that very many cases of heart disease in the end have their course quickened by the accumulation of fluid. Now, there are one or two points that will not take more than a minute or two to bring before you, and they may possibly be useful.

In most of these cases, where the pain is great, you will find that putting a few leeches on the surface tends to ease the pain, but not invariably. One of the cases I have alluded to was not relieved, but in many the pain was rapidly relieved by the application of half a dozen leeches. Half a dozen, more or less, is an average number, but if the pain is severe, a dozen will lessen it, one might say, in almost a miraculous way. I remember seeing one private case, in which every breath that the patient took terminated in a shriek. The pain was so excessive, that each time that the breath was taken it was not passed out again as ordinary expiration, but simply came out as a shriek, and the scene was a most painful one to behold. After the application of twelve leeches the pain disappeared completely. I daresay some of you have had occasion to watch the disappearance of pain in the Hospital, under the application of leeches. I do not know exactly how leeches do act, whether it is simply by abstraction of blood or not, but that they do relieve there can be no doubt.

As far as medicine is concerned, in most of the cases we have used very little medicine. The chief medicine was the very old-fashioned drug, acetate of ammonia, which has the power of lessening the temperature by increasing the sweat; but it does not pull down the temperature in the same way that the more modern drugs, antipyrin, phenacetin, and antifebrin do, and so there is little or no risk of its having any effect in causing collapse. Ammonia, *per se*, is to a certain extent a respiratory stimulant, although its effect as such is not so well seen in the acetate as it is in the carbonate. In cases where the respiration tends at all to fail, then you may give the carbonate of ammonia; and you may even proceed to give such a drug as strychnine, but in most of the cases of simple effusion we have not used this. In the cases of effusion in cardiac disease, you have recourse to a great number of drugs. You may give strychnine and caffein and digitalis, or other cardiac stimulants and tonics, and it may be necessary also to remove the fluid from the chest as well.

SENILE UTERINE CATARRH.

By J. HALLIDAY CROOM, M.D., F.R.C.P.Ed., *Physician to, and Clinical Lecturer on Diseases of Women, Royal Infirmary, Edinburgh.*

(*Read before the Edinburgh Obstetrical Society.*)

THE condition which I propose shortly to discuss is one which is much more frequently met with in private than in hospital practice. Indeed, I can scarcely say that I have met with a typical case in hospital. This is easily explained, as the symptoms, though troublesome, are not severe, and the poorer classes do not seek relief except under circumstances which are more or less urgent.

The subject of endometritis occurring in old women, or rather in women who have for some years passed the menopause, is but meagrely if at all described in any of the text-books—not even in the more recent ones. Various monographs have, however, been written on the subject, and the condition described under various titles. Thus, some have called it the "fœtid endometritis of old women," others "post-climacteric endometritis." Matthews Duncan described it under the name of the "leucorrhœa of old women." But I am inclined to think that the term which best describes the group of symptoms is "senile uterine catarrh."

With the ordinary uterine catarrh of fertile women everyone is familiar, due to a condition of subacute endometritis, and one of the most frequent causes of sterility. The importance, however, of the condition occurring after the climacteric cannot be questioned, and I am sure that a due appreciation of it would save many an unfortunate woman from vaginal hysterectomy, which, with improved methods and increased safety, is too apt to be had recourse to without adequate reason.

It is well known that the great difficulty in the management of such cases is the differential diagnosis from malignant disease, but it seems to me that this is exaggerated, and that with due care and no unnecessary haste an accurate diagnosis can be made in the majority of cases.

Sexton, in an admirable paper on "post-climacteric endometritis," advocates the use of this term, because most appear soon after the menopause. With this I entirely agree. However, while most do come under observation soon after menstruation has ceased, in my experience a large number seek advice many years after the climacteric, and these are the most marked cases although the most difficult to diagnose.

Before going further, and without multiplying cases, let me give three typical examples:—

CASE 1.—A patient æt. 70 complained of a fœtid muco-purulent discharge, accompanied by constant pain in the back, with occasional and irregular attacks of colicky pain in the pelvis, but there was no hæmorrhage whatever. She was pale, sallow, and emaciated. The uterus was about 2½ in. long, retroverted and mobile. The os was somewhat gaping. Her main trouble was the fœtid discharge, and it was for that she specially asked advice. The condition had continued for eighteen months. The diagnosis naturally lay between a commencing malignant disease of the body of the uterus and simple catarrh. She had a probe passed from time to time, dressed with pure carbolic, hot douching, and arsenic; and under this treatment she, after three months, was quite cured and lived for ten years longer.

Case 2. — A patient æt. 65 complained of profuse leucorrhœal discharge, sometimes streaked with blood and occasionally accompanied by a small clot. She had well-marked backache and occasional griping pains in the pelvis. The uterus was considerably enlarged—about 3½ in., hard and globular. In this case the diagnosis was again difficult, but after dilatation of the cervix and curettage of the cavity, with subsequent packing, the patient had no further trouble, and now, after six years, is perfectly well.

I mention the lapse of time, simply because it proves there was no tendency to malignancy in the condition.

Case 3.—The third and last type of cases is that of a patient who, three years after the menopause, had a sudden and profuse hæmorrhage; it was associated with no pain, the os was gaping and soft, the uterus enlarged to about 3½ in. The hæmorrhage continued at intervals of two or three days for three weeks. The woman was extremely emaciated, and appeared in very feeble health. The difficulty here, I confess, was considerable. With a view, therefore, to settle the question, I still further dilated the cervix, and, finding no specially marked prominence in the walls, I scraped the mucous membrane, applied an escharotic, and afterwards drained by means of iodoform gauze, and the patient had no recurrence of her symptoms after a lapse of five years. This patient had every symptom of cancer, but there being no definite evidence of it on examination, she was treated for the simple condition, and got well.

As I have already said, I could multiply cases to illustrate these types, but I take it that these three illustrate what I consider the three forms of senile uterine catarrh—

1. Those associated with fœtid discharge and no hæmorrhage;
2. Those associated with leucorrhœa and slight hæmorrhage; and
3. Those in which hæmorrhage is the main if not the only symptom.

Of course everyone is aware that post-climacteric hæmorrhages are due in the main to (1) the commencement of cancer, or (2) to the recrudescence of a fibroid, or (3) occasionally in gouty women, but of course, in the gouty condition, it is only a form of uterine catarrh, with gouty endometritis as its basis.

The symptoms are extremely like those of malignant disease. The patient suffers from vaginal irritation, and shows marked signs of general cachexia, the skin becoming sallow, and general emaciation sets in. This is really due to a slow sepsis, which is further shown in occasional rigors and night sweats. The most striking symptom, and that for which the patient generally seeks advice, is the vaginal discharge, which is watery and semipurulent, though frequently it contains a considerable amount of blood. The odour of this discharge cannot be said to be characteristic; it is, as a rule, though not always, most offensive, and in some cases I have seen has been even more so than in marked cases of cancer. It may cease from time to time, and when it reappears it is generally with a gush of sanious pus. Along with these symptoms there is frequently a certain amount of abdominal pain, pain in the back, and "progressive invalidism."

Per vaginam, one finds the uterus slightly enlarged or more often normal in size—as a rule, not normally atrophied. The introduction of the sound causes great pain, and if a scraping be removed, this shows inflammatory changes—infiltration of leucocytes, reduplication of cells, and granular degeneration. The mucous membrane of the uterus has become hypertrophied and succulent, and is easily detached. In cases of malignant disease of the body of the uterus, all the above-mentioned symptoms are aggravated, but on vaginal examination the uterus is always markedly enlarged and much more fixed than in senile catarrh.

Real "floodings" are much more common in cancer than in the simple condition. With appropriate remedies, senile uterine catarrh will be found to rapidly improve in the course of a week or two, whereas any treatment other than operative is of no avail in malignant disease; and I have only very seldom found that in doubtful cases the delay at all interfered with the ease with which vaginal hysterectomy was later, if necessary, performed.

Now, with regard to the differential diagnosis between primary corporeal cancer and senile uterine catarrh, the following points are worthy of consideration:—

First and foremost, in most cases of primary fundal cancer, periodic and severe pain is an early and prominent symptom; whereas in senile uterine catarrh the pain is irregular and colicky, or, if not, it is slight and constant.

Secondly, in cancer, fœtid discharge, at least in the earlier stages, is unusual, because the os is closed, and the surface of the cancer is protected from external influences; whereas in catarrh, especially in the first two forms I have mentioned, fœtid discharge is a prominent and early symptom.

Thirdly, local examination in cancer finds the uterus distinctly enlarged, sensitive, and early becomes heavy and fixed; whereas in the simpler condition the uterus either is normal or only slightly enlarged, and remains freely movable throughout.

And, lastly, dilatation and local exploration reveals the presence of a neoplasm in the one case and the absence of all irregularities in the other.

As regards the causes of this senile condition of the uterine mucous membrane, it is difficult to speak with certainty.

1. As a rule, when women have not suffered during their menstrual life from any disorder of the pelvic organs, one may affirm that after the menopause they will be free from uterine disease, since the organs undergo physiological atrophy. But if the patient has been the subject of a fibroid tumour, or has suffered from displacement of the uterus or of any form of inflammation, the uterus may continue large after the menopause, and may be the subject of post-climacteric inflammation, though this is always less marked than when menstrual congestion regularly recurs to aggravate the condition. Yet undoubtedly there are many cases in which senile catarrh occurs, in which there is no history of ante-climacteric disturbance, and in which the uterus is normally poised, and gives no evidence of surrounding inflammation.

2. Tilt pointed out that very often the cervix shrinks, whereas the body of the uterus is inflamed and the fluid becomes pent up, giving rise to colicky uterine pains.

Matthews Duncan had several times to puncture the cervix, so as to allow the escape of inflammatory fluid.

The cases Tilt knew best were those of senile inflammation of the cervix and of the vagina—not so much of the body; and for these post-climacteric inflammations he strongly recommended caustics.

I should like strongly to insist that this condition of senile uterine catarrh is not prodromatic of malignant disease; the two are quite distinct, and I have never seen a case of the simple condition later become one of cancer.

As regards the treatment adopted, when the condition is nonmalignant or doubtful, I have had the best results from rest, hot douching, and the internal administration of arsenic, strophanthus, and chian turpentine. To give the last-named drug may seem contradictory, as it was long supposed to have beneficial effects in cases of cancer. This I do not believe, but it is quite certain that it has a good effect on inflammatory conditions; and, it seems to me, has almost an equally good effect in clearing up purely uterine inflammation, as in cervical inflammatory hypertrophy.

Nothing gives better results than either the application of escharotics by means of dressed sounds, or, still better, the curettage of the mucous membrane, with subsequent packing and draining.

The main point I wish to insist upon in this paper is the fact that these cases are so often mistaken for malignant conditions; and I have repeatedly had patients, supposed to be suffering from malignant disease, sent to me for hysterectomy, who were sufferers from the simpler condition, and which responded to simple treatment.

FRAGILITAS OSSIUM SCORBUTICA.

By G. A. SUTHERLAND, M.D., *Physician to Paddington Green Children's Hospital; Assistant Physician, North-West London Hospital.*

(PLATES XI. AND XII.)

THE following observations refer to this condition as it presents itself in early life. The occurrence of multiple fractures in the long bones is not common in infancy and childhood. To the lay mind it suggests that gross violence must have been used, and charges of cruelty may be made, as in a case to be related. To the medical mind it suggests the presence of some general disease affecting particularly the bones. Certain of these affections are well recognised, *e.g.* rickets, syphilis, osteomalacia, etc.; and under the name osteopsathyrosis, a disease has been described, of which brittleness of bone forms the sole recognisable feature. Probably under no circumstances is this fragility of bone manifested to a greater extent than in scurvy. I have recently met with some well-marked examples of this in infants, which from the severity and extent of the lesions seem worthy of being recorded.

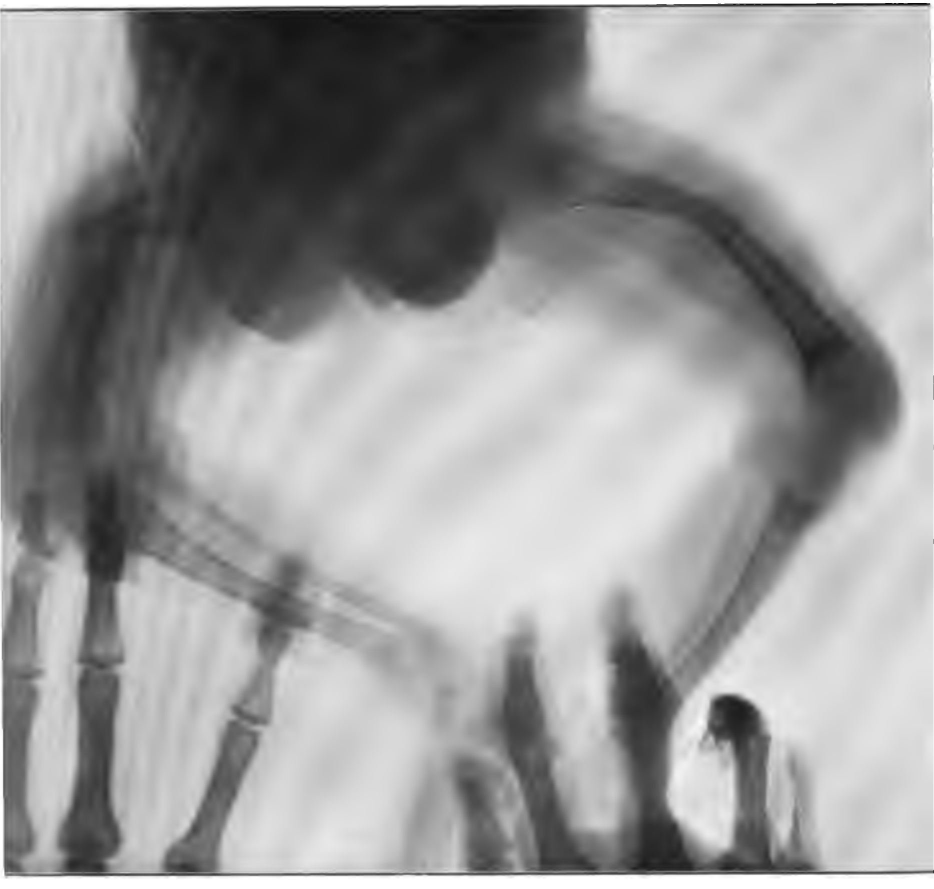
CASE. 1.—A male infant, æt. 4½ months, was admitted to Paddington Green Children's Hospital on 4th December 1896. For the notes of this case I am indebted to Mr. Stroud Hosford, the house physician. The child had appeared to be healthy when born, and had been fed on a humanized (sterilised) milk for the first three months, and subsequently on a proprietary food and water. His appetite as a rule was ravenous, but for two months before his admission he had been troubled with vomiting, and had been losing flesh. The patient was an only child, and there was nothing of importance in the family history.

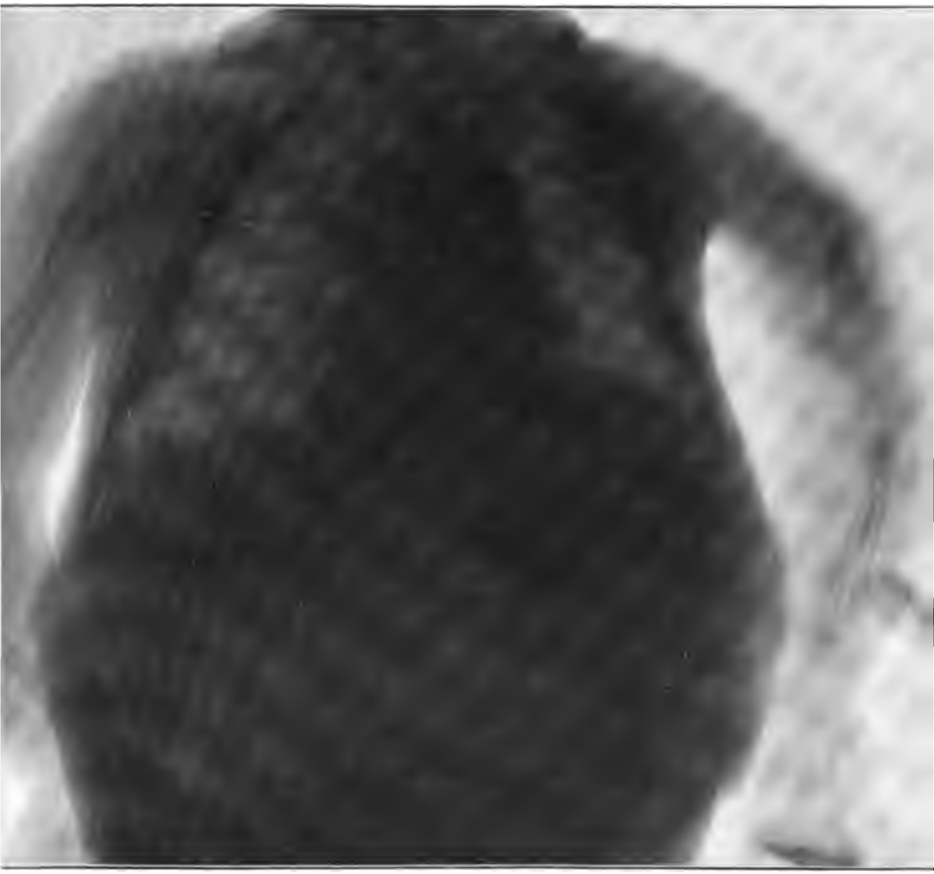
The more special symptoms for which advice was sought had begun three weeks previously, when the mother noticed that he cried when the right arm was moved, and on examination it was found to be swollen, dark in colour, and "limp." The swelling appeared first below the right shoulder, and spread down to the elbow. Two days later, the left upper arm became similarly affected, and then in rapid succession there followed swelling, tenderness, and loss of movement in both thighs, both legs, and both forearms. The swelling was observed to begin in the middle of the thighs, legs, and forearms, and extend towards the joints, and in those parts the skin was not discoloured as it was in the upper arms. The child screamed with pain when touched or moved, and was apparently very ill. Acute rheumatism was diagnosed, and a splint was applied over the right humerus, which was found to be fractured. There was no bleeding from any mucous surface, nor were any purpuric spots observed about the body. As the child did not improve under the treatment adopted, he was sent to the hospital.

On admission the infant was in an exhausted condition, and very tender to touch or movement of any kind. The body generally was anæmic and poorly nourished. There were no teeth, and the gums were pale but otherwise healthy. The skull was small, the bones were not thickened, and the anterior fontanelle was about the size of a threepenny-piece. Rachitic changes in the bones could not be determined, and there was a complete absence of all signs of active rickets, such as sweating about the head, bronchitis, etc. The extremities, both upper and lower, were swollen, tender, and in a condition of complete pseudo-paralysis. The child lay in an apathetic condition, but the slightest movement of a limb elicited screams of pain. The swellings were irregularly distributed around the long bones, in some parts most marked in the course of the shafts, and in others around the epiphyses. Both upper arms showed extensive hæmorrhagic extravasation under the skin, and some superficial mottling, but this condition was not present in other parts of the body. The swellings were evidently subperiosteal, and all of the long bones of the extremities were more or less affected. In addition, several of the bones were fractured, namely, the right humerus in two places, the left humerus, the left radius and ulna, and both femora. One of these fractures, the lower of the two in the right humerus, was at the epiphysis, but all of the others were through the shafts of the bones. The fractures were complete, the broken ends being freely movable, and considerable distortion of the limbs had already taken place. The ribs, scapulæ, clavicles, and iliac bones were apparently unaffected, and, with the exception of some surrounding œdema, the joints presented no abnormalities. The heart, lungs, and kidneys were healthy.

The treatment adopted was rest in bed with support to the limbs, and a diet of fresh unboiled cow's milk, barley water, extract of malt, and orange or grape juice. No medicine was given. Rapid improvement followed, and four days later it was noted that the limbs could be handled without causing crying, and that the swellings had considerably diminished. The child took food well, lost his anxious expression, slept well, and in every way seemed to be proceeding rapidly towards convalescence. Owing to the tenderness of the limbs, splints could not be applied, but the extremities were kept as rigid as possible. On the eighth day it was noted that the tenderness was no longer present, and that the patient moved all his limbs voluntarily, if they were freed. The swellings were no longer perceptible, but thickening could be felt along the shafts of the long bones. A month later the signs of active disease had entirely passed off. The infant was bright and lively, took his food well, and moved all his limbs freely. The fractures were firmly united, but their sites were marked by considerable thickening, and the limbs were much distorted, owing to the absence of proper fixation of the fractures. The temperature had continued normal throughout, and, with the exception of a tendency to diarrhœa, there was nothing further in his condition calling for mention.

The subsequent history of the case is not so satisfactory. It was found impossible to increase the amount of milk beyond a pint daily, as vomiting supervened, and during the next six weeks this tendency to vomiting steadily got more marked, until finally the patient retained little or nothing. Various kinds of food, and various forms of adminis-





tration, were employed without success; the patient lost flesh rapidly, convulsions set in, and he died at the age of 7 months.

At the necropsy the body was found to be extremely anæmic and emaciated, there being very little subcutaneous fat. The stomach and intestines were thin and translucent, but otherwise appeared normal. There was nothing calling for further notice in the contents of the abdomen and thorax. The bones of the skull were not thickened or vascular, but considerable effusion was present under the dura mater. The brain was soft and œdematous. An examination of the long bones confirmed the diagnosis made as regards the fractures, but these were all soundly united. The left femur and right humerus were removed for further examination. The soft parts around were pale, but not otherwise altered. The periosteum was firmly attached to the bones, and the epiphyses were united to the shaft. The femur had been fractured in the middle of the shaft, but firm union of the broken ends had taken place. The bone was much thickened around the seat of fracture, the thickening being composed of bony callus. There had been considerable displacement of the broken ends, which met at an angle, forming a marked projection anteriorly. Similar appearances were present in the humerus. Here the fracture had been about an inch above the lower epiphysis. On section, a large amount of bony callus was found between and around the broken ends, which were rounded off. The medullary cavity was not enlarged, and the surrounding bone was hard and compact. There was no evidence anywhere of rickets, or of active scorbutic disease.

The next case illustrates the typical changes in the bones when scurvy and rickets are present at the same time in an active form, as contrasted with the previous case, in which scurvy existed alone.

Case 2.—A male infant, 12 months old, was admitted to Paddington Green Children's Hospital on the 23rd March 1897. For the notes of the case I am indebted to Mr. Stroud Hosford.

Seven weeks previously the child seemed pained if the right arm was moved, and very soon the legs also became so tender that the child screamed whenever they were touched. The lower extremities became swollen and dark coloured in places. The child developed a cough, and was much oppressed in his breathing. He sweated profusely, and several times a clear rash appeared on the body. He had cut two lower and four upper incisor teeth, and the gums around these became red and swollen, and had to be lanced by a doctor. He was treated for rheumatism without any benefit, and finally was sent to the hospital.

His previous health had been good. He had breast milk for the first five months, and after that cow's milk diluted with equal parts of oatmeal water, Frame food, and for a time beef-juice.

The child on admission was acutely ill. The signs of scurvy were marked. There was general anæmia, with œdema of the lower extremities. The gums around the teeth which had been cut were swollen, spongy, and bleeding. There were subperiosteal swellings and extreme tenderness in the extremities. The child was also suffering from active rachitic disease. There was a prominent beading of the ribs. Acute bronchitis was present, the temperature ranging from 102° to 103° F., and the child sweated profusely.

The condition of the osseous system, to which I wish more particularly to refer, was as follows. The inner extremities of both clavicles were thickened and tender. The whole of the sternum with its cartilages sank backwards during inspiration and rose again during expiration, but the sternum was always to a certain extent depressed, and the anterior thickened extremities of the ribs stood out as prominent subcutaneous swellings; both scapulæ were tender, and there seemed to be some fulness below the spines. There was swelling around the upper epiphyses of both humeri, and these epiphyses were found to be movable on the shafts. The shafts of the radial and ulnar bones were tender and thickened, and around the lower ends of the ulnæ there was an extremely tender semi-fluctuating swelling. The femora were not markedly affected, there being only a slight thickening, with tenderness, around the lower epiphyses. Both legs were œdematous, and, as far as could be made out, there was also considerable subperiosteal effusion along the shafts of the tibiæ and fibulæ, with separation at the upper and lower epiphyses of both tibiæ. It was also thought that the shaft of the right tibia was fractured, an opinion which was confirmed later on.

It is impossible to give an exact report as to the condition of the bones, owing to the swelling of the limbs and the tenderness present, but the above details will serve to show the extent of the epiphyseal affection in this case, as opposed to the extensive involvement of the shafts in the previous case. The child eventually made a good recovery under antiscorbutic treatment, the only deformity remaining being an outward rotation of the right arm, due to union in bad position of the right humerus. The sternum and its cartilages, which had become completely detached from the ribs, became firmly united without deformity.

Case 3.—This was a child æt. 2½ years, who was found after death to have five of the long bones fractured, and whose parents were accordingly prosecuted on a charge of criminal cruelty to the child. The infant was brought up on a diet of bread and water and sugar, and had never been healthy. It had not learned to talk, could not walk without assistance, screamed with pain when placed in a standing position, and was generally regarded as a very backward child. For some months before death bruise-like marks had appeared on various parts of the body, which were ascribed to the child's "falling about." At the necropsy five of the long bones of the extremities were found to be fractured; two of them, the right ulna and right tibia, having united with considerable deformity, and the others being ununited. The left femur was submitted to me for examination, and presented the following changes. At the epiphyses there was definite thickening of a rachitic nature, but not to a marked degree. The medullary cavity was much enlarged, and the bone was very thin, porous, easily indented, and shell-like. In the upper third of the bone there was a transverse fracture, ununited, and surrounded by a considerable amount of soft callus. There was little or no displacement at the seat of fracture. As I did not see this case during life, I am unable to give an exact diagnosis;

but from the evidence given at the trial, and the condition of the bone on examination, I have little doubt that scurvy was an important factor in the production of the fractures.

Case 4.—A male child, æt. 2, was admitted into Paddington Green Children's Hospital on 11th March 1897, under the care of my colleague, Dr. Guthrie, who has kindly allowed me to use his notes of the case.

The patient's previous history was obtained with difficulty, as the parents were foreign Jews. The mother stated that the child had been delicate since birth. Its diet had been equal parts of cow's milk and water. Three months before admission bruise-like swellings had appeared on the arms and the legs, which were dark blue in colour. The mother noticed that first the left thigh, and then the right thigh, and then the upper arms, were broken. The child had never been able to walk.

The child was sickly-looking and rachitic. The condition of the bones was as follows. There were fractures, united, but with considerable thickening, at the inner third of both clavicles. The scapulæ appeared to be thickened at their superior angles. The upper third of the right humerus had been fractured, and there was present considerable deformity and thickening, and the union was not very firm. The left humerus had been fractured above the middle, and some deformity was present, but the union was good. The left ulna was bent on itself at the upper third, but did not appear to have been fractured, and no definite thickening could be made out. The right ulna and both radii were apparently uninjured. (From the skiagram it would appear that the right radius had been fractured.) Both femora were fractured about the middle, and there was great distortion of both thighs, with much thickening around the sites of fracture. No crepitus could be elicited, but there was no union in the right femur. The tibiæ and fibulæ were apparently normal.

During a stay of three months in the hospital the patient's general health improved very much, and there was increased power in the limbs. The broken ends of the right femur were still freely movable, but the other fractures were more or less firmly united. The condition of the bones when the child was admitted is very well shown in the accompanying skiagrams (Plates XI. and XII.). Although there were none of the hæmorrhagic signs of scurvy present when the patient was first seen, I think, from the history of the case and the extent of the fractures, there can be little doubt as to the existence of this disease. The child was shown by Dr. Guthrie at a meeting of the Medical Society of London, and he there stated that he regarded the fractures as scorbutic in origin.

The cause of these fractures in connection with scurvy is found in the altered condition of the bone, due to hæmorrhage under the periosteum, or in the medullary cavity, or both. The extravasation of blood under the periosteum leads to its detachment from the bone, which is thus deprived of a strong support and also of an important blood supply. If the hæmorrhage is extensive, the whole of the periosteum may be rapidly stripped off, and the bone lies bare in a mass of blood and blood clot. Its vitality is soon impaired, atrophy follows, and fracture may occur within a few weeks of this occurrence without the application of any violence. If there is, in addition, hæmorrhage into the medullary cavity, the conditions predisposing to fracture are increased. If the bone be examined after death, the medullary cavity is found to be enlarged and the osseous tissue thin and shell-like. In the more chronic forms of scurvy, with gradual subperiosteal oozing of blood, the process is slower and the affection has usually lasted for some time before the atrophy of the bone is so marked that fracture is easily produced.

In the long bones of the extremities, fracture may occur at the epiphyses or in the course of the shaft. The former is a well-recognised and a common condition, due to hæmorrhage and softening at the junction of the shaft and epiphysis. It is usually associated with rachitic changes in the bone. As there is a tendency to separation of the epiphyses in all growing bone, a tendency which is much increased in various diseases, the term *fragilitas ossium* applies more especially to those cases of scurvy in which fracture has occurred in the course of the shaft. The more extensive the subperiosteal hæmorrhage, the greater is the liability to fracture. Speaking generally, the lower extremities are more frequently affected in scurvy than the upper, and therefore the femora and tibiæ are more frequently fractured than the humeri or ulnæ. The ribs may also be the seat of subperiosteal hæmorrhage, atrophy, and fracture; but the more common condition is a separation at the costochondral junction, as in one of the cases recorded.

The relationship of scurvy to rickets is still under discussion, and by some the two conditions are viewed as one, and spoken of as "scurvy-rickets." I do not think that this fragilitas ossium is characteristic of rickets, although I cannot affirm that multiple fractures of the long bones do not occur in rickets. From my own experience I infer that the association of rickets with scurvy rather tends to prevent this liability of the shaft to fracture. In uncomplicated rickets, the changes in the bones are manifested by softening, bending, twisting, and possibly fracture of the green-stick type; but the fact of the bone being flexible diminishes the tendency to fracture. In uncomplicated scurvy there is no such softening, but an atrophic thinning of the bone, with consequent diminution of its strength. It is in cases of scurvy uncomplicated with rickets, or with only a slight degree of rickets, that I have found multiple fractures of the long bones most marked, as in Case 1. When scurvy and rickets are actively present at the same time, there is a liability to fracture, but this is manifested at the epiphyses and not in the diaphysis of the bone, and is dependent on certain local changes which are the result of the combination of diseases.

The term "spontaneous fracture" is not strictly accurate as applied to cases of scurvy, but fracture does occur without the application of any more force than is used in bathing or dressing an infant. Consequently the fractures are not usually recognised by the mother or nurse, and if there is not much extravasation of blood they are easily overlooked by the physician. This point is important, because the discovery of such fractures after death may lead to a criminal prosecution, as in the case already referred to. In the first case related I could absolutely exclude neglect or violence in the production of the fractures, only one of which had been discovered by the doctor in attendance, and his attention was directed to it by extensive subcutaneous ecchymoses around the broken ends of the bone. Displacement of the fractured ends and distortion of the limb will not probably be marked early in the case. The factors which lead to displacement —the application of force at the time of the fracture, movement of the limb, and muscular action—are usually absent. The subjects of the affection are usually of weak muscular power, and the pain accompanying the subperiosteal hæmorrhage induces a condition of pseudo-paralysis in the affected limb, quite apart from any fracture of the bone. If, however, the infant is strong, or if the scorbutic condition is rapidly recovered from under suitable treatment, then in the former case muscular traction will soon produce distortion of the limb, and in the latter a similar result is produced by the active movements of the limb which follow on the subsidence of pain.

The prognosis as regards such fractures is good, provided that the primary disease is diagnosed and treated. As long as scurvy remains actively present, there is little prospect of a firm union of the bone. A certain amount of soft callus may be thrown out, but the process does not go further. Under antiscorbutic treatment the extravasated blood is absorbed, and union of the fractured ends rapidly takes place. This result is obtained more especially in cases where the scurvy has not been of long duration; but in chronic or relapsing scurvy the atrophy of the bone may have advanced so far that union is imperfect, and the liability to fracture at the same spot or in other parts of the bone is apt to be very persistent.[1]

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[1] See cases by Colcott Fox (*Trans. Path. Soc. London*, 1890, p. 237), and Pickering Pick (*Lancet*, London, 1894, vol. i. p. 1606).

ON THE TREATMENT OF SOME OF THE MORE COMMON EYE AFFECTIONS.

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(*Continued from page* 281.)

SOMETHING has already been said, though mainly with reference to prognosis, of the opacities which remain in the cornea after the subsidence of an inflammation. The area of intransparency may be due, as we have seen, to either infiltration or cicatrisation, or both. The question as to what, if anything, can be done to hasten or promote the clearing away of these intransparencies will often present itself. Cicatricial opacities, in adults at all events, remain indefinitely practically the same, and no treatment is known by which they can be removed. Different stimulating and irritating applications have been tried. Repeated puncturing with fine needles and electrolysis have also been resorted to, with, however, absolutely no effect. Attempts have been made, too, at different times and in different ways, to transplant portions of clear cornea from other eyes, human and animal, after removing bits of corresponding size from the opacities. The transplanted corneal tissue has generally retained its vitality, but has invariably failed to retain its transparency, and thus the effect of the operation has been nil.

It is otherwise with opacities which are the result of infiltration alone. The general tendency with these is to clear away more or less completely, and with varying degrees of rapidity. Their absorption is often slow, and indeed seems, in some cases, to come to a standstill altogether. In such cases there are various means at one's disposal which are to some extent of use in promoting and stimulating the desired absorption; of these, the ones chiefly to be recommended are, massage of the cornea, iodine, turpentine, and sulphate of copper. In very severe cases of dense vascularised superficial subepithelial corneal infiltration, or pannus, as it is called, the irritation necessary to promote absorption may even be got by inducing a purulent conjunctivitis.

Massage of the cornea is best done through the lid. The lid is rubbed quickly, and with gradually increasing force, over the cornea for half a minute, or more, at a time, once or twice daily. To do this effectually, the rubbing must give rise to a moderate degree of surrounding hyperæmia. The massage may also be combined with the use of the iodine ointment already referred to.

A good and not too strong stimulating effect may also be got by the daily use of the following prescription:—

℞ Olei terebinth. . . . . ʒi
Olei amygd. . . . . . ʒij
Sig. Eye-drops. *Misce.*

Sulphate of copper is most useful in pannus. It should be used in the shape of crystals, from which the sharp edges and points have been ground down. The inner surfaces of the lids are lightly touched with these crystals, and some of the salt is then dissolved in the tears, and is thus brought in contact with the cornea.

The very serious consequences to the cornea which are likely to accompany purulent conjunctivitis must necessarily greatly limit the application of the last measure, which has been referred to as a means of stimulating absorption in the case of dense infiltration opacities. The vascularised cornea is, however, better able to withstand the destructive influence of the gonococcus. In dense vascularised pannus, which has given rise to so much intransparency as to practically destroy vision altogether, it is sometimes justifiable, in view of the possible brilliant results which may thus be obtained, to inoculate the eye with some of the discharge from a case of true gonorrhœal conjunctivitis. This is, however, only justifiable if both eyes are affected. The risk should not be run as long as one eye has retained sufficient vision to enable the patient to find his way about, on account of the possibility of its being also attacked by the specific inflammation. Such an accident might happen as the result of any inefficient application of the means which have been referred to by which the sound eye may be protected. In any case, before adopting a cure of such severity, the patient must, of course, be made fully aware of the suffering he will have during the first stage of the inflammation, and of the risk of complete destruction of the eye with which it is associated. The inflammation, too, must be kept in check as far as possible by the antiseptic measures which have already been described.

Another less severe method, but at the same time one which is far less effectual, though entailing no risk of the loss of the eye, is to perform the operation of peritomy. This consists of removing a ring-shaped portion of conjunctiva immediately surrounding the cornea. To do this the conjunctiva is circumcised with a pair of scissors, at a distance all round of about ⅛ in. from the cornea. It then retracts, leaving a gaping wound, which is further enlarged by cutting away bit by bit that portion which remains attached to the cornea. Each bit is seized with a pair of fixation forceps, and cut off close up to the cornea with scissors. The wound is then allowed to cicatrise without any stitching, and under the ordinary antiseptic precautions. The cicatrisation, which slowly takes place, has the effect of causing the greater or less disappearance of the superficial new-formed vessels in the cornea, and, with them, of some of the infiltration.

Many of the forms of primary keratitis are of comparatively rare occurrence, and need not, therefore, be specially considered in this connection. Their proper local treatment will usually be on the lines already discussed from a more general point of view. One not very infrequent form, which appears to be of mycotic origin, may just be mentioned. In this form, when it remains uncomplicated, and when the denuded cornea is not attacked by other microbes, there is a superficial spreading ulceration, which may affect any part of the cornea. The shape of this ulceration comes, as it extends, to resemble the branching of a tree, little subsidiary rills being pushed out as it were from the main trunks, and these again sending out their offshoots. On this account the ulceration has been described as *dendritic*. A dendritic keratitis always lasts a good many weeks—usually at least six weeks. It causes more or less irritation, characterised by circumcorneal injection, lachrymation, photophobia, and pain. It is best treated by dabbing on to its surface some absolute alcohol with a camel's-hair brush. Usually after the first application the symptoms subside, and the treatment need only be repeated whenever they again become aggravated. This variety of keratitis leaves a characteristic scar, which tends to clear away slowly in the course of time, though it rarely disappears entirely.

In the case of superficial ulcers which show a marked tendency to recurrence at frequent intervals—once a month or oftener—the cause of recurrence may often be found to be evidently due to insufficient tenacity or vitality of the epithelium which in the process of recovery is formed over the site of the ulcer. There is thus a tendency for this epithelium to be shed or separated from the underlying tissues in the form of a bleb, often of considerable size. No doubt this occurs owing to some slight injury, such as forcible rubbing of the lid over the eye. Such an injury, however, often occurs during the night, so that the patient is unable to give any other history of the cause than that of suddenly awakening with the feeling of intense pain in the eye. Such a history should always lead one to make a careful examination of the cornea, and it will usually be found that, by sliding the lower lid over it, some portion of the conjunctiva wrinkles up and reveals the presence of a collapsed bulla. The treatment which should then be adopted is to drop some cocaine into the eye, strip off the detached epithelium with a pair of iris forceps, wash with warm boracic acid solution, and apply a bandage.

With regard to the treatment, other than local, of corneal inflammations, it is difficult to make any precise statements. As a general rule, medical treatment in such cases is of comparatively little importance. Yet it is always well to take the general health into consideration. Often one has to deal with essentially strumous individuals, in whom the diathesis has a more or less direct connection with the local inflammation. The same is true, though to a less extent, in gout, rheumatism, dyspepsia, and anæmia. Possibly, also, uterine and other female disorders may sometimes have an influence; they certainly have in connection with some deeper affections of the eye. Much may be done by dieting, Turkish baths, massage, and change of air. The drugs which may be used with more or less reason are iron, arsenic, quinine, salicin, and iodide of potassium.

In certain recurring types of corneal inflammation, baths appear to do good. In this country I have repeatedly sent patients to Strathpeffer, Buxton, Harrogate, Droitwich, and Bath. Others again have derived benefit from one or more visits to Aix-les-Bains, Contrexeville, and Brides-les-Bains in France; and Wiesbaden, Ems, Nauheim, Schwalbach, Carlsbad, and Kissingen in Germany. I have also found some of the higher health resorts in the Engadine and in Norway of great use in the treatment of strumous and tubercular forms of corneal inflammation.

A very commonly met with disease is the so-called *interstitial keratitis*. In this disease the corneal changes are secondary, and there is no actual inflammation of the cornea itself. The interstices are more or less filled with inflammatory products, which are either equally diffused all over, or collected in some spots more than in others. The epithelial covering of the cornea presents a finely uneven, stippled appearance, and there is a development of new vessels in the true corneal connective tissue. These vessels are found in varying amount in different cases. Sometimes they are absent altogether, or practically so. Sometimes they exist in such large numbers, and are so densely arranged, that the cornea, either as a whole or in patches, has a pinkish or reddish colour. The new-formed vessels are offshoots of the ciliary network which surrounds the cornea, and which at the same time are seen to be in a state of congestion. They thus differ from the vessels of a pannus, which are prolongations of the conjunctival vessels.

The duration of an interstitial keratitis is always prolonged, varying from two or three months to a year or more—generally from seven to ten months. The corneal infiltration usually first clears away in the peripheral portions, so that after some time the opacity is mainly central.

Interstitial keratitis never leads to ulceration of the cornea, and usually ends in the complete or practically complete return to the normal state of transparency. It is seldom, however, that a minute examination of the cornea, with oblique illumination and a magnifying-glass, does not enable one to detect some trace of intransparency in the remains of some incompletely absorbed blood vessels. Both eyes are usually affected. As a rule, however, the one is attacked some time before the other. It often happens, indeed, that the one eye is far advanced in recovery before the other has begun to inflame.

The prognosis in interstitial keratitis is therefore good; a practically complete return to the normal transparency is the rule, and there is no fear of ulceration taking place, however dense the infiltration. On account of this favourable prognosis it is well to be able to recognise the secondary type of corneal inflammation, and not confound it with the primary.

The treatment of interstitial keratitis need not be an active one, as far as local applications are concerned. When there is much irritation produced, much circumcorneal injection, with photophobia and lachrymation, the pupils should be kept dilated by the daily use of atropine. It is also well to prescribe dark glasses, and to disallow reading or any work necessitating the close use of the eyes. Occasional hot fomentations, continued for a quarter of an hour at a time, are also useful in such cases. Of internal administrations, probably the most generally suitable is syrup of the iodide of iron. The subjects of this disease are usually young individuals of delicate constitution, with either a hereditary syphilitic or a tubercular taint.

In the comparatively few cases which have run their course, and still left considerable opacity of the cornea, use may be made cautiously of some of the remedies already referred to for promoting the clearing of interstitial infiltration opacities. Neither gonococcal inoculation nor peritomy are, however, suitable measures to employ in such cases. Occasionally, and especially where at the same time the intra-ocular tension has remained low, an iridectomy may be of use.

Wounds of the lids, conjunctiva, and cornea.—Cuts of the eyelids are not infrequent. Only two points call for special attention as regards their treatment. It is well to give some care to the adjustment of the lips of the wound when it involves the lid margin. This should be done by suturing both the conjunctival and skin surfaces close up to the margin. If this is not done, there is always a more or less unsightly nick left. In cases where nothing has been done at the time, and this causes much disfigurement, an improvement may be got by paring the edges of the cleft and suturing. The other point to be attended to is of greater importance. When a wound of the lower lid involves the margin between the punctum lachrymale and the inner canthus, it should not be sewed up without first slitting along the inner portion of the canaliculus. In a fresh wound the severed canaliculus is easily found, and a Weber's knife can be passed along it. If this is not done, an absolutely impassable stricture is formed on cicatrisation, and some epiphora results.

In many wounds of the lids there is considerable bruising of the tissues, frequently leading to abscess. In such cases even comparatively trifling skin abrasions should be treated antiseptically. When an abscess has formed, it should be opened by a free incision in a direction parallel to the lid margin, and preferably either through or immediately below the eyebrow. The abscess cavity should then be syringed out with a strong antiseptic solution, kept drained, and allowed to heal slowly.

Cuts of the ocular conjunctiva are followed by retraction of the surrounding membrane, so that they gape widely. They should therefore be stitched with fine silk, after the wound has been properly bathed with boracic acid or other mild antiseptic solution. The stitches may be removed in three or four days.

The treatment of burns, with lime, molten metal, etc., of the ocular and palpebral conjunctiva, has already been considered in connection with the risk of symblepharon which such accidents entail. Foreign bodies, if small and sharp, which hit the eye with some force, and yet not sufficiently forcibly to penetrate its coats, may become fixed in the ocular conjunctiva. An attempt may then be made to remove them with a spud or other sharp-pointed instrument. When this proves difficult, as is often the case, the simplest plan is to grasp the foreign body through the overlying conjunctiva with a pair of fine-ribbed or toothed forceps, and then with scissors cut it out along with some of the conjunctiva. The gaping space which results may then be closed by means of one or more fine conjunctival sutures.

Foreign bodies of various kinds, dust, engine sparks, etc., frequently remain adherent to the palpebral conjunctiva of the upper lid. The usual site for such foreign bodies to occupy is the conjunctival surface covering the tarsus, especially the portion of it which lies near the free lid margin. These can readily be removed by everting the lid. Attempts at removing them without eversion, with a camel's-hair brush, or the tip of the tongue passed below the upper lid, should not be made. The lid is easily everted by causing the patient to look down, then slightly raising it with the thumb of one hand placed just below the eyebrow, while the eyelashes, thus held well away from the eye, are seized between the thumb and forefinger of the other hand. The first thumb is then pushed gently backwards and downwards, so as to depress the conjunctival fold, and the lid margin then rapidly pulled over it, so as to rotate round it as a fixed point. The first thumb may be replaced by a thick lachrymal probe, or any small thin rod or shaft of an eye instrument. When the suspected foreign body is not found on the tarsal surface, the fold itself must be properly inspected. This is often neglected. It is most readily done by anyone not sufficiently practised to do it with the fingers alone, by pressing a probe down on the skin of the lid, whilst it is held everted, and the patient is got to rotate his eye downwards as far as possible.

Wounds of the cornea are frequent. They may be caused by cutting bodies, directly, or by severe blows. In the latter case a rupture usually takes place, not of the cornea itself, but at or near the corneo-scleral margin, and roughly concentric with it. Direct injuries to the cornea may or may not cause perforation. The latter are of course on the whole the more serious. In both cases, however, a good deal depends on the nature of the body with which the injury has been inflicted. It is well, therefore, always to get as trustworthy an account of the accident as possible. Curiously enough, this is sometimes not easy, as either the patient himself or his friends not unfrequently try to conceal the circumstances of what they feel was a careless and avoidable accident.

I have seen the cornea more or less seriously injured by almost every conceivable thing—knives, scissors, forks, hair-pins, needles, nails, glass, crockery, curling-tongs, bits of metal of all kinds, animals' teeth, claws, horns, children's nails, bits of wood, and many others. The first consideration will then necessarily be, was the substance likely to be clean, from a surgical point of view, or not? A wound may be comparatively trifling in itself, merely it may be amounting to a slight epithelial loss, but septic matter may have been introduced, and unless antiseptic precautions have been taken in time, serious consequences may result. Much depends also, as has already repeatedly been insisted upon, on the state of the conjunctiva and mucous membrane lining the lachrymal sac. In the more superficial wounds of the cornea, it is a good plan, in addition to using antiseptic bathings, to clear away any epithelium which may have been destroyed, though not shed in the vicinity. This provides a clean surface, and prevents the lurking of microbes. After efficient bathing, the wound may be dusted with iodoform and the eye bandaged.

In deeper non-penetrating wounds, the more or less complete adaptation of the lips makes it difficult to disinfect properly. In such cases, the proper thing to do is to treat the case at first in the same manner as if it were quite superficial, but keep the patient under observation for a day or two, in case any decided evidence of a septic inoculation should show itself, when it is necessary to destroy the area of the wound with the thermo- or other cautery. Even at first, when the history of such an accident shows that it was caused by a dirty instrument, it is well to disinfect as actively as possible, using for this purpose chlorine water applied with a camel's-hair brush.

Perforating wounds of the cornea do more or less harm, altogether independently of the question of whether septic matter has been introduced into the eye or not, according to their site, shape, and extent. Small clean-cut wounds, made by some sufficiently aseptic body, heal very rapidly and leave little scar, if they are linear and not too oblique. The apposition of the lips of the wound is then good, and ordinary antiseptic precautions, and tying up the eye for a couple of days, is all that will be required in the way of treatment. If, in addition, they lie beyond the pupillary area of the cornea, the prognosis as regards vision is good, always supposing that the lens has not been injured at the same time. Larger linear wounds, even if they are got to heal without any prolapse of iris taking place through them, always leave some defect. The defect is greatest if they are central, and is caused not only by the cicatrix, which, under favourable conditions of healing, may be astonishingly slight, but by alterations of curvature, which become permanently established in the pupillary area of the cornea—irregular astigmatism. The treatment of prolapse of iris has already been discussed. With regard to wounds, however, it must be remembered that, inasmuch as they are more likely to come under observation shortly after their occurrence, it is more often possible to replace the prolapse. The thing to aim at in the treatment is to get good apposition of the lips of the wound; and the usual point which will have to be considered in any case is, as to whether this shall be got by replacing the prolapsed iris or by removing it. The decision on this point should be influenced by the degree of injury which the prolapsed iris has suffered, as well as by the nature of the body, in regard to probable asepticity, which has caused the accident. Further, when attempts are made to reduce the hernia, a good deal must depend upon the ease with which this can be done. In clean-cut wounds, especially linear wounds made with a clean instrument, or in cases in which the cornea has burst without anything having come directly in contact with it, it is justifiable and generally easy enough to replace the iris. In dirty, ragged, irregular-shaped wounds, on the other hand, the prolapsed iris must be sacrificed, or, if the case be seen some days after the accident, left, and removed later in the manner already referred to.

Where the eye has burst at or near the cornea-scleral margin, the treatment should be as follows:—First, the wound must be properly disinfected, and for this purpose efficient irrigation with boracic solution is usually sufficient, unless the conjunctiva and tear sac are chronically inflamed, when chlorine water should be used. Any prolapsed tissue should then be snipped off—not returned. When this has been done sufficiently to allow the wound margins to come into fair apposition, the surrounding conjunctiva is freely undermined with a pair of scissors, and then brought together with two or three stitches, placed deeply in such a way that when they are knotted the transplanted conjunctiva is puckered well over the wound. Care must be taken, too, not to have the conjunctival sutures lying directly over the deeper wound. This operation not only provides a covering, but brings the edges of the underlying wound together. As a rule, it is better to avoid stitching the sclera. This is only necessary in the case of very large wounds, and in these the question of the propriety of enucleating the eye may arise. When the sclera is stitched, the sutures must be placed as superficially as possible. After the completion of the operation, iodoform should be freely dusted into the eye, and a fairly tight bandage applied.

(*To be continued.*)

ON THE ILLUMINATION OF THE AIR SINUSES OF THE SKULL, WITH SOME OBSERVATIONS UPON THE SURGICAL ANATOMY OF THE FRONTAL SINUSES.[1]

By A. Logan Turner, M.D., F.R.C.S.Ed., *Surgeon for Diseases of the Ear and Throat, Deaconess Hospital, Edinburgh.*

When I first commenced to work at the sinuses accessory to the nose, it was my intention to give a general summary of our present knowledge of the surgery of the frontal sinuses, ethmoidal cells, maxillary antrum, and sphenoidal sinus, but at the very beginning of my investigations I found so much of anatomical and surgical interest in the frontal cavities, that I shall confine my remarks mainly to the frontal region, which is so full of practical importance, not only to the rhinologist, but also to the general physician and surgeon.

It may be as well to state here that the facts deduced are based upon an examination of over one hundred skulls. Many observations have been made upon the crania of different races of mankind, several cadavera have also been examined, and an investigation has at the same time been carried out upon living persons, both with healthy and with diseased sinuses.

In the earlier years of the present century considerable interest was manifested in the frontal sinuses. The doctrine of phrenology occupied a prominent place in the "ologies" of the day, and in Gall and Spurzheim on the Continent, and in Combe in Scotland, were found able exponents of the view that there is a correspondence between the volume of certain parts of the brain and the intensity of certain qualities of mind and character. According to these authorities, the areas of the brain representing such qualities were moulded within the cranial vault, and thus influenced the development of the contour of the skull, giving rise to certain elevations which were the outward expressions of the internal organs. It is needless here to elaborate this theory. Unfortunately for the phrenologists, they concentrated all their smallest organs in the region of the frontal sinuses behind an obstacle possessing an extraordinary and varied range of development. Thus at one stroke, even if no other reason existed, they weakened, if they did not at once destroy the whole groundwork of phrenological observation. The elaborate investigation of Sir William Hamilton[1] into the frontal sinuses of many crania, and the careful and skilful deductions drawn by him from anatomical facts, enabled him to advance powerful arguments against such a doctrine. The formation of the cavities in the frontal bone, by a divergence from parallelism of the two tables, renders any relation between the surface of the brain behind, and the external surface of the skull in front, impossible. We shall have an opportunity later of seeing the extent and variation in the development of these air spaces. Amongst the many organs placed by phrenologists in this region is the organ of Aptness to Learn and Retain Things, localised by Gall over the root of the nose, upon and above the glabella ossis frontis. He has endeavoured to show that, in addition to its development in man, it exists in some animals more than in others, and he selects those which are to some degree capable of being taught by man; these are marked by a prominence of the forehead nearly in proportion to their capacity of being taught. He cites amongst other animals the dog, but the dissection of a dog's skull, which I have made, demonstrates at a glance the existence of a large sinus in the glabellar region, and the consequent separation and divergence of the two tables of the frontal bone. The organ of Aptness to Learn and Retain Places, a quality well developed in the same animal, is bilateral, and is situated on each side of the previous one; it also is covered by the sinus just demonstrated. Combe placed the organ of Benevolence, or Good-nature, in the horse in the middle of the forehead, a little above the eyes, and he held that the disposition of this animal, its viciousness or its good temper, was found to be in accordance with the development of the prominence in this region. The impossibility of judging of the relation between cerebral development and external configuration is at once evident, when we observe that a large and roomy sinus may be interposed between the frontal tables in the horse's skull.

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[1] A lecture delivered before the Royal College of Surgeons, Edinburgh, 25th February 1898. The methods of illumination were demonstrated, and variations in the anatomy of the frontal sinuses were illustrated by lantern slides.

Under the organ of Aptness to Learn and Retain Things, Gall quotes the elephant, but no better demonstration can be offered of the absurdity of comparing the external configuration of the skull with the development of the brain surface than by a glance at the enormous and extensive air spaces in the skull of that animal. How difficult it is to determine from the external inspection of a skull, which is rendered irregular by the development of bony ridges and processes on its surface, what the development of the subjacent brain may be, is seen from a study of the supra-orbital region of a male gorilla. The thick and massive supra-orbital ridges consist for the most part of solid bone, but in the less prominent and somewhat depressed area of the skull lying between them and the elevation of the forehead, two well-developed frontal sinuses may exist. Such is a mere glance at a few phrenological data, which serves, however, to contrast the kind of interest taken in the frontal sinuses in the earlier half of the nineteenth century, with their position at the present day in practical surgery, and it further demonstrates their presence in some of the lower animals.

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[1] *Med. Times and Gaz.*, London, May, June, August 1845.

All the accessory cavities of the nose have come within the range of surgical interference. Acute and chronic suppuration of these sinuses are conditions which are by no means uncommon; in many instances the diagnosis is full of difficulty, partly from the anatomical relations of the region, inspection being difficult and ready access by no means easy, and partly from the fact that two, three, or more of these cavities may be similarly affected at the same time.

Illumination of these sinuses, introduced by Voltolini and perfected by Heryng and Vohsen, has now come into general use as an aid in diagnosis. By transillumination, the German *Durchleuchtung* or through-illumination, we mean the passage of rays of light through the walls of a cavity from one surface to another, either through a bony cavity like the antrum of Highmore, or through a hollow viscus like the larnyx. The walls must not be of such a nature as to prevent the transmission of the rays, and the apparatus employed must be sufficiently powerful. An electric lamp of five-candle power, producing a bright white light, generated by means of a series of bichromate cells, was the means adopted in all the following experiments, care being taken that equality in the intensity of the light was maintained throughout.

Great care must be taken that the room is completely darkened, as the entrance of any extraneous light renders accurate observation difficult. For the examination of the maxillary antra, the tongue depressor bearing the lamp is provided with a small vulcanite plate, which, lying on the dorsum of the tongue, prevents any contact of the lamp with that organ, and its consequent heating or burning. If a dental plate is worn by the patient, it must in the first place be removed. After the lamp has been placed in the centre of the mouth, and the patient's lips closed upon the stem of the tongue depressor, contact is made by pressure upon a button in the handle of the instrument; and in certain normal states the rays of light pass through the hard palate or floors of the maxillary antra into each cavity, and thence through their outer walls, where they are visible upon the cheeks to the eye of the observer; the light passes also through the roof of each antrum, or floor of the orbit, the reflection of the rays being thrown upon the retina. If the person under examination be asked to close the eyes, the perception of light may become obvious to him in one or both of them, as the case may be, and if the observer looks through the pupils the reflection may then become evident to him. In observing the luminous rays as they appear on the cheeks through the outer wall of the cavities, attention must be turned to the infra-orbital region, where a zone of light passing outwards towards the malar bone indicates that the rays must have penetrated the antrum. In most cases light is transmitted through the lower part of the face, whether in health or disease; but in this region it passes merely through the soft tissues of the upper lip and lower part of the cheeks, below the level of the antral floor, and must therefore not be taken into consideration.

A knowledge of the phenomena met with in transillumination of *healthy* antra is essential for a proper appreciation of its value in disease. In dealing with these cavities, and with the ethmoid cells and frontal sinuses to be presently discussed, I have conducted my observations along three lines—first, by the examination of *skulls*; secondly, by an examination of the sinuses of presumably healthy individuals; and, thirdly, by a study of cases of disease. It is necessary to mention, in passing, that certain precautions must be taken in carrying out this examination upon the dried skull. When the skull is divested of all its soft parts, the light from the lamp reaches the observer's eye through various channels, as the orbital cavities, the nose, and the temporal fossæ; and, further, round the alveolar margin of the upper jawbones, thus rendering accurate observation of the antra quite impossible. In order to prevent this diffusion of light, it was found necessary to stuff the cavities and fossæ above referred to with cotton-wool, and to fringe the alveolar margins with a thick layer of wool, so as to exclude all extraneous light. After noting the appearance of the outer wall of each antrum, it was only necessary to remove the plugs from the orbital cavities, in order to learn how far the roof of the cavity formed by the orbital floor had become illuminated. The lamp was held in the centre of the hard palate. As the result of this examination upon twenty-four skulls, the following facts were ascertained:—

Nine illuminated equally on the two sides, both as regards outer wall and antral roof; five illuminated better on one side than the other; three illuminated on one side only; three failed to illuminate on either side.

There still remain four skulls, which do not fall into any of these groups; in one, both outer walls illuminated faintly, while on neither side did the roof transmit light; in three, the anterior wall on one side illuminated better than the roof on the same side.

It was found, as a rule, that if the lamp was removed from under the middle of the hard palate, and placed more directly under the floor of the antrum, first on one side and then on the other, that the illumination on the side beneath which the lamp lay, became intensified, while it diminished upon the other. This exemplified the necessity for a mesial position, when careful comparison of the two sides was required. In the three skulls in which no illumination was obtained in any area, the placing of the lamp laterally and more directly under the antrum failed to make any alteration in the result previously obtained.

It is evident, therefore, from these observations, that perfect equality in the transmission of light through these cavities is not always to be found. Anatomical variations are met with in the antrum; the cavity may be enlarged by the formation of recesses in the alveolar process of the jawbone, or by extension between the tables of the hard palate, thus hollowing out the floor of the nose. On the other hand, the cavity may be reduced in size on one or other side, from approximation of its outer and posterior walls, or from bowing outwards of its inner or nasal wall, or it may be absent altogether. The thickness and density of the walls also vary; hence several causes exist to account for slight or marked differences in the intensity of the illumination, not only in different skulls, but on the two sides of the same skull.

Turning next to an examination of a number of presumably *healthy living persons*, we again find that variations are met with. In all the cases that were carefully noted, both cheeks (*i.e.* the outer wall of each antrum) illuminated, with one exception. This latter was a man between 50 and 60 years of age, with somewhat fleshy cheeks, but not showing any remarkable development of the bones. In his case, too, no reflection was thrown upon the retinæ. In the other cases, the intensity of the light varied; in the majority, it was equal on the two sides; in others, and these were the exceptions, the illuminated area was rather brighter on one side than the other; in women and children, the intensity may be marked; but even in men, bright illumination may be obtained, the result appearing to depend partly on the consistence of the bone, and partly on the thickness of the soft tissues of the face. The subjective sensation of light experienced by the individual under examination, due to the rays of light falling upon his retina after transmission through the orbital floor, was always inquired into; usually, this corresponded to the illumination of the cheek; if illumination of the outer walls gave equal intensity on the two sides, retinal perception of light corresponded, as a rule. When one side of the cheek lighted up better than the other, the sensation of light was plus upon the brighter side. In one instance, where illumination of the cheeks was the same on the two sides, the individual found subjective light sensation less in one eye than in the other; and in another instance, in the same class of case, there was no light perception in one eye. Examination through the pupil by the observer did not prove very satisfactory, and consequently no deductions have been drawn from this test.

The most important observation made during this examination, from its surgical bearing, was, that in no instance did one cheek illuminate while the other remained in darkness, thus differing from the skulls. The significance of this point will become more apparent when we consider the question of disease. If it is a constant factor, but we are not prepared to say that it is, it is also a very valuable one. When studying the living person, other points in addition to the bone must receive some consideration, namely, the soft tissues of the face, the mucous membranes, the orbital fat, and even the tunic of the eyeball; variations in the density of these structures may exist, and diminish or intensify the power of the rays transmitted.

It is necessary to dwell for a moment upon the passage of the luminous rays from the mouth to the antrum and orbit; with the exception of a very small portion of the outer part of the palatal plate of the superior maxilla, close to its alveolar margin, the whole of the hard palate forms the floor of the nose, and takes no part in the formation of the floor of the antrum, that wall being formed by the alveolar process bearing the teeth. When the lamp is placed in the centre of the mouth, some of the rays must pass into the nasal fossæ, and thence through their outer walls into the antra. Those rays which pierce the eyeball and fall on the retina must do so in two ways, partly by passing from the nasal fossa into the antrum, and thence through its roof, and partly by piercing the inner portion of the floor of the orbital cavity directly from the nose. This may be proved by a very simple experiment, which I have carried out upon myself and upon others. The antra are illuminated in the ordinary way, and the result noted both by the observer and the observed. The inferior meatus of the nose is then plugged with gauze, and the lamp is again inserted. If equality of illumination was previously noted, it is now found that frequently on the plugged side subjective sensation of light is diminished, and the illuminated area upon the cheek is hardly so bright. The experiment may be concluded by plugging the other nostril, and noting a similar effect upon that side of the face. The practical application of this fact is to be found in a careful attention to the condition of the interior of the nose, and in the exclusion of ethmoid disease, of nasal polypi, or other cause of obstruction in the patients under examination. If, instead of holding the lamp in the middle plane of the mouth, it be placed first upon one side and then upon the other, that is, more directly under each antrum in turn, as was done in the case of the skulls, it is found that the subjective light sensation, and even the illumination of the cheek, increases, though this latter phenomenon is not always perceptible upon the side above the lamp, while it diminishes upon the opposite side. Hence the necessity of care in the position of the lamp.

The study of transillumination in *disease* of the antrum must be made with a full knowledge of such common aberrations in health as we have above alluded to. The presence of pus in the antrum usually prevents the transmission of light; as we have already referred to other causes which may do this, we cannot say that it is only an antrum that contains pus, or some solid growth that is negative to illumination. At the same time, if other symptoms and signs suggest the presence of antral suppuration, and the suspected cavity fails to illuminate, we may feel certain that we have to deal with pus in that situation. Out of twelve antra which I have examined by this method, all of which were proved by operation to be the seat of suppuration, all with one exception failed to illuminate, thus offering a marked contrast to the bright illumination of the opposite healthy sinus. If such a result could be obtained in all cases of disease, we would at once have a most valuable aid in diagnosis. In this series of cases, unfortunately, the subjective light sensation was not always noted, but where it was inquired into it was absent on the diseased side.

Difficult cases are sometimes met with, where one cannot make up one's mind as to the existence of pus. This may be due to the coexistence of disease in the antrum of the opposite side, to the presence of disease in one or more of the other accessory cavities, or to the fact that so small a quantity of pus or muco-pus lies in the suspected antrum, that the state of the cavity may closely resemble a healthy one, so far as illumination is concerned.

The case of positive illumination above referred to was one in which both antra were diseased, and where only a very small quantity of stringy muco-pus was afterwards found in each cavity. Both antra illuminated very faintly, though no subjective light sensation was perceived by the patient. We do not have, therefore, in transillumination a perfectly reliable means of diagnosis in every case of antral suppuration; but it is undoubtedly a valuable aid, and in a large number of cases it enables us to affirm positively that pus will be found in the suspected cavity. I have had the opportunity of examining recently some cases which have been operated upon and cured, and in them have found illumination of the previously diseased cavity restored; in one, the intensity did not quite equal that on the other side, but possibly this was the normal state of affairs, while in another the affected side illuminated more brightly than the other. In this, too, we may have had a return to the normal condition. We may therefore utilise transillumination in after-treatment, with a view to assisting us in arriving at a knowledge of the progress of the case towards recovery.

Illumination of the antrum in diagnosis is not limited to suppurative conditions only, but it has a more extended application. Solid tumours resist the passage of the luminous rays, while, on the other hand, cystic distension of the cavity or an accumulation of serous fluid allows the light to penetrate. Cases of distension with clear fluid have been observed, where the light was intensified upon the diseased side. Alexander[1] of Berlin, in a recent paper upon cysts of the mucous membrane of the maxillary antrum, found, on the other hand, exploratory puncture of more value in diagnosis, though the cysts did not offer any perceptible opposition to the rays. In tumours of the nasal fossæ, transillumination of the antrum may be of undoubted value, in excluding the possibility of involvement of that cavity by the growth. In a case of bleeding tumour of the nose, recently under the care of Mr. Cathcart, and in which certain features suggested sarcoma, we were able to exclude involvement of the antrum by positive illumination on that side. Cases of ozæna should be submitted to this test, so as to exclude the possibility of any associated accessory cavity suppuration before the treatment of the intranasal condition is commenced.

Ethmoid cells.—Attempts have been made to give a place to illumination in the diagnosis of suppuration of the ethmoid cells, and some observations have been made by Ruault[2] and Robertson[3] with this end in view. An examination of the macerated skull for this purpose was useless, partly on account of the destruction of the parts in so many specimens, and partly from the difficulty in efficiently cutting off the surrounding light.

The part of the face to which Ruault directed attention was the bridge of the nose; when the lamp is placed in the centre of the mouth, as we have already seen, the nasal bones may become illuminated, the rays having first presumably passed through the hard palate, nasal fossæ, and ethmoid region; if the nose be plugged with gauze, in a person whose bridge illuminates brightly on both sides, the light disappears from that region. A number of healthy persons were examined, with the object of testing the illumination of the nasal bones, and greater variation in results were met with than in a similar examination upon the antra. In many cases they failed to light up on either side, others again illuminated upon one side only, or illuminated more faintly and less extensively upon the one side than the other, while in others again the intensity and distribution of the light corresponded on the two sides. For a proper estimation of the value of this method of diagnosis, it will be found necessary to examine a large number of cases of ethmoid cell suppuration; unfortunately, my own observations do not extend over a sufficiently large number of cases to justify me in drawing any conclusions upon this point. The few cases examined, however, led me to make a note in favour of the method as an aid in diagnosis. In one case of undoubted unilateral ethmoid disease, the nasal bone on the same side was in shadow, while the one on the opposite side illuminated brightly: and I have not yet seen the case where illumination of the bridge occurred with ethmoid suppuration. In the case of the ethmoid cells, as with the other sinuses, we must consider other signs in conjunction with illumination.

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[1] *Arch. f. Laryngol.*, 1897, Bd. vi. Heft 1.

[2] *Arch. de laryngol.*, 1893.

[3] *Journ. Laryngol.*, London, 1892.

The sphenoidal sinus.—The anatomical position of this sinus prevents its investigation by this method.

(*To be continued.*)

ON THE RELATION OF THE NERVOUS SYSTEM TO DISEASE AND DISORDER OF THE VISCERA:

The Anatomy and Physiology of the Nervous Mechanism of the Viscera.[1]

By ALEXANDER MORISON, M.D. (Edin.), F.R.C.P.Ed.

(*Concluded from page* 236.)

THE PHYSIOLOGY OF VISCERAL CONTROL.

IN considering the relation of the nervous system to secretion, visceral motion, and excretion, I desire to touch upon some points in the more recent conceptions of physiologists which are at variance with the views of many of their predecessors, and which are still open to discussion. As regards secretion, for example, it may be permitted to inquire what a nerve of secretion is?

Secretion, like every other form of distal motion, being a peripheral, outgoing, or efferent event in its active phase, its immediately regulative nerves belong necessarily to the outgoing or executive series. They are motor nerves. Secretion, however, like every other peripheral activity, is not solely caused by influences entering or leaving a gland and its associated territory. The secreting cell, like the muscle cell, comes into being before, so far as we know at present, it is in touch with nerve elements. There is doubtless, therefore, an essential secretory irritability, as there is an essential motor irritability. But the length of time for which either secretion or motion could continue in an independent organism, when a given organ is severed from its nerve supply, is admittedly a limited period, and the actual length of this appears to be shorter in an inverse ratio to the complexity of the organism as a whole. Thus the reptile survives longer than the mammal, when the main innervation of viscera essential to life is divided.

Every peripheral movement in an ordered mechanism, whether that mechanism be an animal, a plant, or a universe, has a regulating centre—an initial or necessary source of motion in general, or of vital motion, that is life, in particular, by which these properties are conditioned. To solve this mystery would be to solve the mystery of life or even of abstract being, a problem which has defied so far not only the physicist but also his bolder brother the metaphysician, and appears likely to do so, until the finite contains the infinite, a somewhat remote prospect.

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[1] The Morison Lectures, delivered before the Royal College of Physicians, Edinburgh.

Without aspiring to be defined, as a learned judge is said to have defined the metaphysician, namely, as a blind man looking for a black hat in a dark room, the hat in question not being there, it is permissible to consider with caution, and with a just sense of our limitations, the centre or centres of energy in the animal economy, without reference to the manner in which force is produced or reproduced.

As sensation, in one phase or another, precedes motion, in one form or another in more complex and fully developed animals, it may be assumed that the initiating centres of energy are in the sensory portion of the nervous system, and that it flows thence down the efferent stream of innervation. This position is opposed to that maintained by Bain,[1] but this is not the time to argue the point. The impulses which explode energy in such centres arise in the afferent system of sensory nerves in the case of peripheral actions, and the active factors in such explosions are stimuli applied to such sensory nerves.

We have seen in the anatomical section that the afferent nerves pass, so far as can be ascertained, through the ganglia which intervene between the periphery and the centre, without the interruption of arborisation on intervening cells.

The exploded energy, on the other hand, travelling down the efferent nerves, encounters innumerable arborisations on intercepting ganglion cells, and, like the current of a stream flowing towards its outlet into the ocean, splits or may split into as many fresh channels as arise between the centre and periphery. These fresh channels arise, we have seen, from the innumerable ganglion cells which are formed on the trunk and branches of the efferent system of nerves, cells which transmit and are permeated by the outflowing energy. The question then is, What is the relation of these cells to this energy?

Of experiments, the object of which is to show the relation of the nervous system to peripheral action, whether secreting, viscero-motor, or vasomotor, we may take the well-known one dealing with the nervous mechanism of secretion in the submaxillary gland as a type. I base my description of it on Professor Foster's lucid narrative in the last edition of his text-book of physiology.[2]

The submaxillary gland of an animal is exposed, a tube is placed in the gland duct, and its nerve supply rendered accessible to stimulation. The efferent nerves which go to the glands are (1) a branch of the chorda tympani, in the course of which, as it approaches the glands, ganglion cells appear; and (2) branches of the sympathetic, coursing along the blood vessels. The afferent nerves are the lingual branch of the fifth and branches of the glosso-pharyngeal nerves. Stimulation of the lingual, or of the glosso-pharyngeal, causes a profuse secretion of saliva by reflex action. If the lingual nerve be divided at a point more central than that at which its companion chorda diverges from it, stimulation of the lingual very naturally produces no reflex secretion. If, however, the peripheral end of the divided chorda be stimulated, the efferent impulses thus generated produce a copious secretion for some time, accompanied by vaso-dilation. That vaso-dilation is not the essential cause of the secretion, moreover, is shown by the cessation of the latter, even in presence of the former, if the secretory function be placed in abeyance by the administration of atropine, and also when the dissevered head of an animal still retains the faculty of glandular secretion.

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[1] "Emotions and the Will," p. 328.

[2] P. 420 *et seq.*

Similarly, stimulation of the sympathetic is associated with the production of a more viscid, scantier, but more potent secretion, accompanied by vaso-constriction. In this case, atropine is said to have less influence in restraining secretion.

My excuse for relating these well-known facts on this occasion is, that they are of interest in connection with a parallel which I intend to draw, and which Professor Foster likewise suggests, between the action of different *efferent* channels of glandular innervation and those regulating the action of the heart.

The rôle of the peripheral ganglionic cell in this process interests us most at this moment.

When Langley, by the general and local use of nicotine,[1] showed that, after paralysis of ganglionic cells, stimulation of post-cellular fibres could still induce peripheral results, he in no way indicated all the functions of the paralysed cell. The question of a peripheral reflex from these cells may, it is true, be regarded as answered in the meantime in a negative sense by physiologists; but the question of a possible *storage* of *peripheral energy* in efferent ganglia is not settled by the disproval of a *true nerve reflex* at the periphery.

These cells, we have seen, are acknowledged to have the power of producing axis cylinders, that is nerve fibres, but are denied other properties than a vague nutritive quality, and the function of distributing a nerve supply over a wider area than would be possible to the cerebro-spinal fibres alone, which enter the ganglion.

The eviscerated heart which, when pricked, contracts, does so in the light of the fully resuscitated Hallerian theory of nerveless rhythmicality, by the explosion of non-neural energy in the muscle fibre. But this is surely an absolute assumption. The assertion, moreover, that this phenomenon can be induced in muscle, assumed likewise to be devoid of nerve supply, must also, we have seen, be regarded with more than scepticism, because such nerveless territories have in more than one instance been shown by improved methods of staining to be well supplied with nerves. Krehl and Romberg, for example, quoted by Dogiel,[1] thought there were no nerves in the apex of the heart of a frog, but Dogiel and others have proved the contrary. Even in the assumed absence of ganglionic cells, which would be a large assumption, it is possible that nerve plexuses, with distributing points, such as were shown when dealing with the anatomy of the subject (Plate I. Fig. 2, and Plate II. Fig. 3), may retain an irritability capable of further provocation, by the various artificial expedients used to rouse the energy of the eviscerated heart, or of portions of it. There is naturally no question here of true reflex action, but merely of the possible stimulation of efferent nerves, regulating by an acquired automatism the contraction of the muscles which they supply.

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[1] *Loc. cit.*

The conclusion, therefore, seems warrantable, until indubitable proof to the contrary has been adduced, that at least in the fully developed organs of more complex animals, *persistent* rhythmicality has its proximate and always subordinate centres in the efferent stream of innervation. No one, it appears to me, who has seen the perfect consecutive contraction of the auricles and ventricles in a recently killed animal, can avoid the belief that no theory of mere inherent rhythmicality can fully account for this phenomenon. The same lesson appears to be taught by the disorders of rhythmical action observed by the clinician, and with which we shall be concerned in a subsequent lecture.

What I have said with regard to cardiac rhythmical action seems to me to apply equally to viscero-motor and vasomotor action elsewhere. The relation of peripheral ganglia to the efferent nerves in such a rhythmical organ as the spleen, for example, has been shown in the anatomical portion of these lectures to be such, that these nerve-producing centres may, without the exercise of much imagination, be considered as storehouses, in a subsidiary sense, of the outflowing energy, and as capable of playing a part in the automatic contractions evinced by that organ, when separated from its grosser nervous connections.

Among rhythmically contracting organs we must also include the arteries and some veins; and the extraneural situation of ganglia on nerve trunks regulating the vascular supply of such an excretory organ as the kidney, seems likewise to suggest that a subsidiary storage of energy in these nerve-producing cells is not incompatible with the trophic power more generally conceded to them.

To return to the analogy between secretory and viscero-motor innervation, it will be remembered that I described two kinds of ganglia in connection with the heart, namely, those on the trunks antrum usually prevents the transmission of light; as we have already referred to other causes which may do this, we cannot say that it is only an antrum that contains pus, or some solid growth that is negative to illumination. At the same time, if other symptoms and signs suggest the presence of antral suppuration, and the suspected cavity fails to illuminate, we may feel certain that we have to deal with pus in that situation. Out of twelve antra which I have examined by this method, all of which were proved by operation to be the seat of suppuration, all with one exception failed to illuminate, thus offering a marked contrast to the bright illumination of the opposite healthy sinus. If such a result could be obtained in all cases of disease, we would at once have a most valuable aid in diagnosis. In this series of cases, unfortunately, the subjective light sensation was not always noted, but where it was inquired into it was absent on the diseased side.

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[1] *Arch. f. mikr. Anat.*, Bonn, 1894. Bd. xliii. S. 225.

Difficult cases are sometimes met with, where one cannot make up one's mind as to the existence of pus. This may be due to the coexistence of disease in the antrum of the opposite side, to the presence of disease in one or more of the other accessory cavities, or to the fact that so small a quantity of pus or muco-pus lies in the suspected antrum, that the state of the cavity may closely resemble a healthy one, so far as illumination is concerned.

The case of positive illumination above referred to was one in which both antra were diseased, and where only a very small quantity of stringy muco-pus was afterwards found in each cavity. Both antra illuminated very faintly, though no subjective light sensation was perceived by the patient. We do not have, therefore, in transillumination a perfectly reliable means of diagnosis in every case of antral suppuration; but it is undoubtedly a valuable aid, and in a large number of cases it enables us to affirm positively that pus will be found in the suspected cavity. I have had the opportunity of examining recently some cases which have been operated upon and cured, and in them have found illumination of the previously diseased cavity restored; in one, the intensity did not quite equal that on the other side, but possibly this was the normal state of affairs, while in another the affected side illuminated more brightly than the other. In this, too, we may have had a return to the normal condition. We may therefore utilise transillumination in after-treatment, with a view to assisting us in arriving at a knowledge of the progress of the case towards recovery.

Illumination of the antrum in diagnosis is not limited to suppurative conditions only, but it has a more extended application. Solid tumours resist the passage of the luminous rays, while, on the other hand, cystic distension of the cavity or an accumulation of serous fluid allows the light to penetrate. Cases of distension with clear fluid have been observed, where the light was intensified upon the diseased side. Alexander[1] of Berlin, in a recent paper upon cysts of the mucous membrane of the maxillary antrum, found, on the other hand, exploratory puncture of more value in diagnosis, though the cysts did not offer any perceptible opposition to the rays. In tumours of the nasal fossæ, transillumination of the antrum may be of undoubted value, in excluding the possibility of involvement of that cavity by the growth. In a case of bleeding tumour of the nose, recently under the care of Mr. Cathcart, and in which certain features suggested sarcoma, we were able to exclude involvement of the antrum by positive illumination on that side. Cases of ozæna should be submitted to this test, so as to exclude the possibility of any associated accessory cavity suppuration before the treatment of the intranasal condition is commenced.

Ethmoid cells.—Attempts have been made to give a place to illumination in the diagnosis of suppuration of the ethmoid cells, and some observations have been made by Ruault[2] and Robertson[3] with this end in view. An examination of the macerated skull for this purpose was useless, partly on account of the destruction of the parts in so many specimens, and partly from the difficulty in efficiently cutting off the surrounding light.

The part of the face to which Ruault directed attention was the bridge of the nose; when the lamp is placed in the centre of the mouth, as we have already seen, the nasal bones may become illuminated, the rays having first presumably passed through the hard palate, nasal fossæ, and ethmoid region; if the nose be plugged with gauze, in a person whose bridge illuminates brightly on both sides, the light disappears from that region. A number of healthy persons were examined, with the object of testing the illumination of the nasal bones, and greater variation in results were met with than in a similar examination upon the antra. In many cases they failed to light up on either side, others again illuminated upon one side only, or illuminated more faintly and less extensively upon the one side than the other, while in others again the intensity and distribution of the light corresponded on the two sides. For a proper estimation of the value of this method of diagnosis, it will be found necessary to examine a large number of cases of ethmoid cell suppuration; unfortunately, my own observations do not extend over a sufficiently large number of cases to justify me in drawing any conclusions upon this point. The few cases examined, however, led me to make a note in favour of the method as an aid in diagnosis. In one case of undoubted unilateral ethmoid disease, the nasal bone on the same side was in shadow, while the one on the opposite side illuminated brightly: and I have not yet seen the case where illumination of the bridge

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[1] *Arch. f. Laryngol.*, 1897, Bd. vi. Heft 1.

[2] *Arch. de laryngol.*, 1893.

[3] *Journ. Laryngol.*, London, 1892.

Nevertheless, when the parts are in an abnormal condition, even slight stimulation may produce a very marked effect in consciousness."

When we arrive at the clinical portion of these lectures, this question will meet us again. My object in referring to these points at present is, to emphasise the fact that our perception of pain, arising from visceral causes, may be as acute as any capable of being generated elsewhere, and that the nature of sensibility, except in the skin, does not differ appreciably in the somatic and splanchnic divisions of the nervous systems.

On the other hand, be the condition of the viscera what it may, our voluntary control over the *efferent* stream of innervation flowing towards them is equally small. The channel *to* our perceptions, in other words, from the viscera to the brain, is potentially quite open; the channel *for our will* is, somehow, blocked between the brain and the viscera.

The *emotions*, however, affect the viscera as easily as they do the parts supplied by the somatic nerves. The difference, one is tempted to say, between the emotions or feelings and the will is the difference between the afferent and efferent sections of the nervous system, the emotions, or "feelings," being sensory, the volitions sensori-motor.

The *genius loci* urges one at this point to make a digression into metaphysics in the city of Dugald Stewart, of Thomas Brown, and of Sir William Hamilton. But we must remember the pitying smile with which the conventional physiologist would regard us, did we do so in the course of a physiological lecture, and leave to a more convenient season that wrestling with the transcendental for which our countrymen are famous the world over, and which has contributed in no small measure to their success in more material spheres. For your transcendentalist can, on occasion, be an exceedingly practical person, as the Afghan discovered who was charged by Rudyard Kipling's Highlander, after the latter had philosophically commented upon the unfortunate necessity involved in the occasional use of the bayonet! The difference between the power of emotion and of will to affect the viscera is nevertheless worthy of comment.

The emotion which arrests the heart's action and checks digestion appears to be a descending inhibition, liberating, on the theory advanced, products which, under normal conditions of the muscle and secretory cell, provide sooner or later a cross stimulation of the complementary sympathetic visceral nerves, and hurry the heart into katabolic activity. Whether this holds good also in the case of the gastric and other secretions, and a complementary sympathetic juice comes to the aid of the inhibited vagal secretion, we cannot, so far as I know, positively assert at present. But such experimental evidence as we possess does not appear to contradict such a notion. On the principle, moreover, of compromise, adaptation, equipoise, or, as Herbert Spencer terms it, "equilibration" in nature, which pervades and knits the everchanging but indestructible whole, such a process would seem very reasonable.

On the other hand, notwithstanding the oft-quoted case of "the Honourable Colonel Townshend,"[1] who is stated to have been able to arrest his heart's action at will, no effect upon the viscera, brought about by volition, is in any way comparable to that constantly exercised by the emotions upon these organs. None such is conceivable or known.

The rehabilitation of the scientific reputation of ancient worthies in the sphere of splanchnic physiology is a noteworthy phenomenon. Haller has many supporters of his theory of nerveless rhythmicality in the present day. Remak's accuracy has been vindicated by Paterson in his embryological study of the sympathetic system. I also venture to recall the name of an almost forgotten physician, whose views appear to me to contain an element of truth, which has not been altogether discredited by subsequent research.

Dr. James Johnstone, in his "Essay on the Ganglions of Nerves," published at Shrewsbury in 1771, maintained some theses which cannot be supported with our present knowledge of the subject. But in regarding ganglia as "checks to the process of volition" (p. 22), and if we restrict our meaning to ganglia of the efferent stream, it appears to me that these structures, in their histological condition and physiological behaviour, support Dr. Johnstone's opinion.[2]

Did the *efferent* stream pass through the peripheral ganglia, without arborising on nerve-producing cells, as Kölliker considers the *afferent* stream does, it is highly probable that our voluntary control of the viscera, if spasmodic, would in any case be as decided as our perception of pain under certain circumstances, when the *afferent* stimulus is originated in the vegetative organs of the body.

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[1] Cheyne's English malady, quoted by Guy and Ferrier ("Forensic Medicine," p. 239).

[2] James Johnstone was born in 1730, at Annan in Dumfriesshire. It was inevitable, therefore, that one or other of his descendants should unsuccessfully claim the dormant Marquisate of Annandale. This one of them did some years ago. Johnstone studied under Whytt, whose portrait hangs on these walls, and graduated as doctor of medicine at the University of Edinburgh in 1750. He is not to be confused with his son James, who also graduated in Edinburgh in 1773. Johnstone, after studying in Paris, settled in practice at Kidderminster, and later at Worcester, where he died in 1802. His first essay on "The Use of the Ganglions of Nerves" was published at Shrewsbury in 1771, and in 1795 again formed the most important part of his "Medical Essays and Observations." His employment, as a disinfectant in typhus, of "the thick white steam of muriatic acid, set free by pouring small quantities of vitriol from time to time upon common salt, heated in a chafing-dish of coals," was recommended for use by a committee of the House of Commons in 1802. These facts, together with his publication of an essay containing a scheme for the abolition of slavery, show him to have been a many-sided and ingenious man. Further particulars concerning him are to be found in the "Dictionary of National Biography," from which some of the facts mentioned were gathered.

As I have stated, there is no question of the adoption of his views concerning the functions of ganglia, as a whole, but his essay contains suggestions well worthy of consideration even in the present day.

It is, moreover, not maintained that the motor cells and processes of the cerebral cortex reach the periphery without arborisation on intervening motor cells, in the central nervous system; nor can it be argued that secondary motor cells are impotent to generate efferent force, and transmute sensibility into motion. The whole physiology of the spinal reflex disproves this.

It may, indeed, be contended that physiologists believe they have shown that energy, to rouse motor cells in any and every part of the body, must *always* arise *de novo* in some portion of the sensory system. But a motor nerve will induce contraction in a muscle, when electrical stimulation is applied directly to its trunk; and we have seen that the secretory nerve, severed from its central connection, may still be made to exercise its function, by similar stimulation of its peripheral portion.

To this it may doubtless be replied, that these effects are the result of stimulation of the inherent irritability of the ultimate structures, namely, the muscle cell, or secreting cell, as the case may be. To prove this, however, two conditions are necessary—(1) That these ultimate structures should be made to manifest their properties on the direct application of the stimulus to them as is *apparently* easy enough in the case of muscle; and (2) that the parts locally stimulated should be shown to be free from nerve elements. Now, the "ganglion free apex," which is at present the sole hope of the Hallerists, still appears to stand, to use an expressive German idiom, "on weak feet." The contention, therefore, that all manifestations of peripheral motor energy must arise *de novo* in the sensory system, cannot be regarded at present as indisputable. It is thus premature to conclude that there is no dormant energy in motor cells and processes, capable of explosion by other means than by transmitted sensory impulse. The effects of electrical stimulation, indeed, appear to disprove this, for no one confuses vital nerve impulse with electricity. The pinprick or slap which rouses the eviscerated heart to contraction is probably electrical in nature, but neither these nor the current of a battery are any more nerve force than is the match, which may be the immediate cause of the blowing up of a powder magazine, gunpowder.

Why, then, should the ganglion cells on the efferent splanchnic stream be excluded from every other function than the production and nourishment of fibres, and the property of conductivity? These very qualities appear to me to argue the probability of the peripheral storage of secondary energy by them, and the innumerable arborisations of outgoing fibres in the tangled net of intervening ganglia some impediment to the efferent impulses of the will.

Some support, finally, appears to be given to this view, by the peculiar behaviour of visceral muscle under electrical stimulation, as manifested by the delayed response to such stimulation, or the "refractory period," as it has been called, the disproportion between cause and effect, and the phenomenon of the "staircase" or cumulation of viscero-motor contractions, observed and related by various physiologists.

With Dr. James Johnstone, I therefore consider it probable that these ganglia may be regarded as checks to volition, and that they are just as important factors for consideration, in accounting for involuntary muscular action and secretion, as are either the anatomical character of peripheral mobile and secretory structures, or the essential irritability, whether rhythmical, secretory, or excretory, which is proper to all living matter.

In having, with, I trust, becoming diffidence, expressed myself thus, I have no desire to assume the irrational attitude of a special pleader in physiology. I hold no brief for the splanchnic nervous system. The client of the natural philosopher, in the widest sense of the term, is Truth, and anything which falsely masquerades in that guise is sooner or later denounced and renounced in physics, although for a time it may hold us in bondage, clad as an angel of light. I merely maintain that those who would reduce the viscero-motor nervous system to the passivity of a telegraph wire have not yet proved their case.

In a discussion, preliminary to the consideration of the relation of the nervous system to visceral disease and disorder, it is necessary to refer to the connection between the manifested force which we call "mind," and the non-cogitative functions which we term "body."

It will be remembered that in examining the sources of the vago-glosso-pharyngeal nerve in the medulla, that view was adopted of the nature of the nucleus, usually regarded as the sensory root of this important nerve stream, which considers it to be a gathering point for afferent fibres of the vagal system, whence they are connected with other nerves and with more remote portions of the encephalon. The very general terms I employ in making this statement, are a measure of our present ignorance as to particular knowledge on this point. We appear, however, to be justified in regarding the opinion expressed as correct. Ramon y Cajal has described and figured a direct connection between fibres of the vagus and the ascending root of the fifth nerve; and it is very reasonable to expect that continued investigation of this region, and of the paths whereby sensory impulses pass from the cord to the cortex cerebri, by staining methods and induced degeneration, will prove still more certainly that intimate connection between visceral innervation and the higher nerve centres, which we know, on physiological grounds, to be quite unquestionable.

It is necessary, therefore, in connection with our present theme, to inquire shortly into the nature of those encephalic influences and stimuli which such lines of neural conductivity bring to bear upon the viscera, and by which the viscera also influence the activity of the higher centres.

Were we to be guided by Professor Bain's definition of a definition, namely, that "a definition should itself be intelligible, and composed of terms not standing in need of farther definition,[1] it would be hazardous to proffer any definition of *mind.* Inasmuch, however, as we as physicians must have some more or less definite conception of the forces with which we have to deal, we may be pardoned if we attempt to formulate to ourselves, in the generation in which we live, some proximately adequate verbal equivalent for so wide and mysterious a force, even though our mental grasp should embrace but a very small portion of it.

With this apology, our present knowledge appears to warrant our regarding mind *as a mode of vital motion manifested by some cells of the cerebral cortex, and as the more or less permanent product or effect of such motion, which we call memory.*

When we examine so instructive and beautiful a diagram as that with which Dr. Batty Tuke illustrated his lecture in this hall, on the cerebral convolution regarded as an organ,[2] and which I have had reproduced as a lantern slide, and when we consider, moreover, the results of experimental physiology and of diseases affecting the brain, particularly those associated with aphasia, we cannot avoid the conclusion that, whatever the mind may represent to the speculative philosopher, to us as physicians it must be regarded as a product of cellular activity, however we may define it. Nor need such a conclusion carry with it a materialistic conviction, in the philosophic sense. If evidence for the existence of a more permanent soul be not found in the collective history of the joys and the sorrows, the aspirations, the defeats and the triumphs of our race, it is scarcely probable that it will be discovered in the crucible of the chemist, or in the workroom of the physiologist.

The constructive school of modern physiologists who have busied themselves with the origin of life, will in all probability for æons of æons, if their patience endure so long, remain like the pedant Wagner at their task in the manufacture of their *homunculus.* That sprite, when he appears as the embodiment of finite life evolved by finite ingenuity, will probably greet his triumphant maker, from the romantic depths of the flask, in the words of Goethe's famous creation:—

> "Nun Väterchen! Wie stehts? Es war kein sherz!
> Komm, drücke mich recht zärtlich an Dein herz!
> Doch nicht *zu* fest, damit das glas nicht springe."

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[1] "The Senses and Intellect," p. 2.

[2] *Edin. Med. Journ.*, 1894.

"Ah, Pápa! how then goes it? 'Twas no joke!
Come, press me gently to thy parent heart!
But not *too* fondly, lest thou break the bottle."

With the mystery and incomprehensibility of life and its various manifestations, including mind, we are not, however, at present concerned. Our business is with the product man, and with so much of him as is more or less comprehensible. Averting our eyes, therefore, like Faust from the endless macrocosm of life in the abstract,[1] we must, less ambitiously, direct our attention to the sufficiently large microcosm of *human* life, and endeavour to understand in some measure its manifestations in the sphere of thought.

Every form of functional activity alters the conditions of the structure manifesting it. This is true of the secreting cell throughout the body. It is no less true of the cells whose activity results in the manifestation of mind. On a former occasion, Sir John Tuke interestingly described the changes which have been observed to result from the normal and artificial stimulation of nerve cells (their obscuration and irregularity induced by wakefulness and work, and their restoration of contour and original character by sleep and rest); brain cells, and the cells of the spinal centres, thus, like digestive or salivary cells, manifest changes indicative of work and non-work. When, however, we come to the question of the registration of impressions, without apparent anatomical change of parts, we arrive at a theme which must still be treated entirely hypothetically, but changes associated with which must, nevertheless, be regarded as existent. Whether the registration of memory be *in* the cell, or merely rendered possible through the instrumentality *of* the cell, we cannot now say, and possibly never shall be in a position to assert positively; but that it would be impossible *without* the cell, and that the passage of impressions *through* the cell influences the organic conditions of the latter, may be assumed to be so probable as to carry with it the assurance of certainty. Every possible explanation of the nature and seat of mind in its various manifestations, which the ingenuity of man, from pre-Platonic down to post-Cartesian times, could devise, has long ago been given. The operations of the mind can be described more or less interestingly by metaphysicians, but they cannot explain them any more than the child can the flight of an eagle as it soars into the empyrean, although it has the power to follow it with its eye for a short distance.

Our inability to explain memory and many other elements of mind does not, however, shake our conviction that all these are the results of cellular activity.

On this point, with a clearness of statement and an elegance in diction characteristic of his writing, Dr. Maudsley remarks: "Of no mental act can we say that it is 'writ in water'; something remains from it, whereby its recurrence is facilitated. Every impression of sense upon the brain, every cerebral reaction which passes into muscular movement, leaves behind it some modification of the nerve elements concerned in its function, some after effect, or, so to speak, memory of itself in them, which renders its reproduction an easier matter, the more easy the more often it has been repeated, and makes it impossible to say that, however trivial, it shall not under some circumstances recur. Let the excitation take place in one of two nerve cells lying side by side, and between which there was not any original specific difference, there will be afterwards a difference between them. This physiological process, whatever be its nature, is the physical basis of memory, and it is the foundation of the development of all our mental functions."[1]

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[1] "Welch' Schauspiel, aber ach ein Schauspiel nur,
Wo fass, I dich, unendliche Natur!"

I am not aware that now, twenty years after these words were written, any more can be said upon the subject. For us as physicians, and in connection with our present theme, it is enough that no manifestation of mind can occur without cellular excitation, and that such cells are portions of an organism which is one and indivisible, however various the functions of its several organs.

These cellular activities and persistent impressions are proper to all animal life, and are capable of influencing the organism manifesting them for good or for evil. In the microcosm of man, however, we have to deal with a development of ideation as peculiar to him as the maintenance of the erect position. When Mephistopheles wrote in the album of the young student, "Eritis sicut Deus, scientes bonum et malum," that profound judge of human nature added, as the awestruck boy withdrew, and with something as nearly approaching a sigh as His Highness was capable of, "A *weary* man thy likeness to the gods will make of thee." This likeness to the gods, however indistinct at times that image may become, the physician has to bear in mind in every department of the healing art, outside the sphere of veterinary medicine. For, while the first impulse of every living creature is to *live*, the desire of an ideational creature is to live in accordance with that which makes life precious to it, and which is not always of the most Godlike nature. These are self-evident conditions, which do not admit of argument. The suicide terminates his existence, when his brain is *not* disorganised, and sometimes probably when it *is*, not because he has ceased to desire life, but because he cannot live the life he desires. Even when he has no thought of laying violent hands upon himself, circumstances, whether they favour the attainment of his ideal or no, act upon his cogitative cells *so* as to generate stimuli of an invigorating or depressing character, as Dr. William Falconer of Bath, writing from his knowledge of the long experience of man, rather than from physiological investigation, pointed out more than a century ago in the first Fothergillian prize essay.[1] Such stimuli by efferent channels act in promoting the health and life or disease and death of the viscera, and of the body of which they are a part. Physical disorders, on the other hand, which impair the nutrition of the centres of vital force, directly or indirectly produce similar results, in various ways, with varying rapidity, and in varying measure.

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[1] "The Physiology of Mind," 1876, p. 27.

How often, for example, do we encounter cases in practice, in which the weariness of life causes the patient to desire death, when the actual cause of disturbed health or happiness appear to us quite inadequate to account for so much distress. And, again, how frequently do we observe the desire to live strong in those, the cessation of whose discomfort can only coincide with the termination of life. This despondency in some cases, this unquenchable hope of recovery on the brink of dissolution in others, as also the anxious, or calm and heroic struggle for life in yet others, are noteworthy phenomena, and reveal to us how complex a creature we have to deal with in man. Could we explain more fully the organic relations of the *tædium vitæ*, of the *spes vivere*, and of that *magna quies*, that grand composure manifested in face of the still greater quietude of death, we should have made a considerable advance in our knowledge of the relation of the nervous system to visceral disease and disorder. These subjects are, moreover, germane to the topics discussed in a lectureship on mental diseases—that is, on the mental symptomatology of cerebral disorders. As Maudsley has eloquently remarked, in his "Goulstonian Lectures on Body and Mind" (p. 102): "The mental effects of perverted sensation afford a promising field of future research; when better understood, it cannot be doubted that they will explain many phenomena in the pathology of mind, that now quite baffle explanation. It behoves us to clearly realise the broad fact, which has most wide-reaching consequences in mental physiology and pathology, that all parts of the body, the highest and the lowest, have a sympathy with one another, more intelligent than conscious intelligence can yet, or perhaps ever will, conceive; that there is not an organic motion, visible or invisible, sensible or insensible, ministrant to the noblest or to the most humble purposes, which does not work its appointed effect in the complex recesses of the mind; that the mind, as the crowning achievement of organisation, and the consummation and outcome of all its energies, really comprehends the bodily life." To a humble study of some such points in the pathology of visceral control, and the clinical phenomena observed when such control is impaired, I purpose devoting the remainder of this course of lectures, appreciating full well the difficulty of the subject, and also my own inability to do it justice.

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[1] "Memoirs of John Fothergill," by Lettsom, 1786.

THE CRANIUM OF THE INSANE: OSTEITIS DEFORMANS AND ACROMEGALY.

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(*Continued from page* 272.)

(PLATES XIII. AND XIV.)

LANE[1] takes exception to the term inflammation being applied to thickening and sclerosis of bones, such as has been described. He looks upon the hypertrophy as a physiological process, by which the brain is to be shielded from injury when the bone becomes softened in old age or by disease. His argument is largely based on the presence of bony thickenings, which he says may be found on the skull of persons accustomed to carry heavy loads upon their heads. In a previous paper[2] he writes: "The increase in the thickness of the skull is not the direct effect of the process of disease or excessive decay, but a vigorous effort on the part of the organism to oppose the direct results, and limit their deleterious effect in a simple mechanical manner. . . . It is mechanical in its causation, being dependent upon and remedial of the softening which precedes it." This he thinks is in no case proved so clearly as in osteitis deformans.

Moreover, Lane disbelieves also in the primary sarcomatous nature of that disease as a cause for the hypertrophy that takes place more or less throughout the osseous system. However, it is clear that a large proportion of the recorded cases of osteitis deformans have been associated with malignant growths in the bones, combined or not with cancerous growths in the internal viscera. But this has not been invariably so. In some carefully detailed accounts no deposits of a malignant nature have been referred to, and do not seem to have existed. Paget himself was first led to believe that the disease was simply of an inflammatory nature, and later, when the existence of cancerous growths was shown to be commonly associated with the disease, he merely regarded the two as a coincidence, or implied that the development of malignancy in the bone occurred as a sequence to the older condition. This is the view also which appears to be most generally held at the present time. Butlin[3] still believes in the opinion he expressed, after microscopically examining Paget's early cases. Without discussing the pros and cons as to the disease being due to an inflammatory lesion, it would seem that we have two classes of cases—those in which malignant disease has been shown to co-exist,[1] and those in which there was no clear evidence of this, but in which the deformity appears to result solely from an increased deposit of new bone. The first case I record is of the second variety, the second is doubtful, and the third is of the first variety of osteitis deformans.

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[1] "The Physiology and Pathology of some of the Variations in the Human Skeleton," *Lancet*, London, 1889, vol. i. p. 522.

[2] "The Factors that determine the Hypertrophy of the Skull in Mollities Ossium, Osteitis Deformans, Rickets, and Hereditary Syphilis," *Lancet*, London, 1888, vol. i. p. 815.

[3] *Ibid.*, 1876, vol. ii. p. 714; *Brit. Med. Journ.*, London, 1897, vol. ii. p. 1338.

In no cases is uniform hypertrophy of the cranial bones carried to such an extent as in Paget's osteitis deformans. In museums there may be found skulls presenting enormous thickening of the bone, and one may read in old post-mortem notes descriptions of the same thing. These are usually put down as cases of hyperostosis of the cranial vault. Rarely is any mention made of the condition of the rest of the skeleton; more likely than not it has seldom been examined. It seems to me highly probable that some of these were possibly what we should now regard as cases of osteitis deformans.

Paget, when he first called attention to the disease,[2] and again more fully in the first Bradshaw lecture,[3] contended at some length that the disease was of recent origin, and was unknown to the great surgeons who immediately preceded him. I do not think he sufficiently took into consideration the existence of these old skulls. For instance, there is in the museum of the Royal College of Surgeons a skull belonging to the original Hunterian collection,[4] showing general uniform thickening of the cranial vault to the extent of ¾ in., with hypertrophy of the bony prominences at the base. In general character it closely resembles the skull of a modern instance of osteitis deformans. Such, likewise, may be an old undescribed skull in University College Museum, the cranial portion of which is thickened uniformly to as much as ½ in., and of a porous roughened nature. There is a slight elevation above the orbital plates; no tumour formation is seen.

A fair number of cases of this disease have now been described in the medical journals and transactions of societies, but a large proportion of these are of persons still living, and good specimens of the disease are still rarities in our museums. To the published accounts I will now add one of a patient recently dying in Colney Hatch Asylum, referring more particularly to the condition of the skull, which in some features appears to be unique, and also add brief notes of two more cases of what would appear to be instances of the same disease.

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[1] A most remarkable case is recorded by Wherry under the term "osteoporosis of the cranial vault." The skull was riddled by large holes that contained malignant growth (*Brit. Med. Journ.*, London, 2nd June 1894, 19th Sept. 1896). The calvaria, from a case described by Barlow (*Med.-Chir. Trans.*, London, 1882), preserved in University College Museum, is uniformly thickened, of a spongy nature, with numerous sarcomatous deposits; some of these are localised and project slightly above the surface, others more generally infiltrate the bone. Growths of a similar nature occurred in several long bones, and in the lungs and peritoneum.

[2] "On a Form of Chronic Inflammation of Bones (Osteitis Deformans)," *Med.-Chir. Trans.*, London, vol. lx.; and *Lancet*, London, 1876, vol. ii. p. 714.

[3] "Some Rare and New Diseases," *Lancet*, London, 1882, vol. ii. p. 1018.

[4] No. 691. This was dug up in a churchyard; the depressed condition may be the result of burial.

CASE 1.—*Osteitis deformans.*—FEMALE, 5065, died in Colney Hatch Asylum on 26th April 1896, æt. 71. She had been an inmate of this asylum for twenty-three years, but had an attack of insanity ten years previously. She was the wife of a cabman.

On admission, in January 1873, she was pale and weak, and the subject of melancholia; was incoherent and deluded, and had attempted to strangle herself; was continually moaning and groaning, and refused to answer when spoken to. Previously, as stated in the certificate, she had been very excited, raving, and said people accused her of not being a woman, and of being a thief. During the long period she remained in confinement she was quiet, well conducted, clean in habits, as a rule usefully occupied at needlework, and usually in very good bodily health. She showed signs of mental weakness, loss of memory, frequently muttered incoherently, and swearing to herself. She was never suicidal or dangerously inclined, and as time went on she gradually passed into a more demented state.

In the year 1881 it is first noted that she was subject to attacks of facial erysipelas. From this date up to the time of her death, fifteen years later, she repeatedly had the disease. It occurred at frequent intervals, always in a very severe form, and on many occasions it was thought likely to prove fatal. In April 1892 she was laid up with influenza, at the time when that disease was so rife in the asylum, and carried off a large number of the older inmates.

I never had an opportunity of seeing this patient during life, but those of my colleagues who had seen her during the past four or five years were struck with the peculiar attitude and size of her head; it, however, never seems to have occurred to anyone that she might be suffering from such a disease as osteitis deformans. Her back was considerably bent, and she carried her head very forward. The breadth of the forehead and increased size of the nose gave to the face a peculiar and unpleasant aspect. No deformity of the limbs was observed. Dr. Seward, whose knowledge of the patient dates back the furthest, tells me that he felt certain that the patient's head had of late gradually been getting larger, but the whole process had been extremely slow and insidious. It is unfortunate that we have not a photograhp for comparison. Future observers will be better placed, for now all fresh patients are photographed on admission, and the likeness inserted with the notes of the case. There was no history of syphilis, nor any indication of the disease on her body. For years she had been too demented to give any rational reply to questions. She seldom spoke, and never complained of pain or other symptom. She died from exhaustion of her mental disease, associated, it was believed, with phthisis, but this latter proved incorrect.

Post-mortem.—It may be noted that the height of the patient was 5 ft., and the body somewhat emaciated. Apart from the head, the only deformity observed was a forward curvature of the spine. The hands and feet were not enlarged. No twisting of the limbs or bending of any of the long bones existed to any appreciable extent; but, on feeling through the skin, it was discovered that the upper third of the right femur and the lower third of the left tibia were considerably thickened; this seemed to be a general thickening, extending uniformly round the shaft, without the development of any localised tumour associated with either bone. No similar thickenings existed of the upper limb bones. Nothing abnormal was observed about the pelvis, the clavicles, or the ribs, but these latter were not examined in detail. The skin of the body was of normal appearance, there was no sign of old scars, hairs existed to a normal extent. The thyroid gland did not seem affected. The lungs were emphysematous, but presented no signs of tubercle. The pleural cavities were empty. The heart somewhat hypertrophied, some atheroma of aorta; kidneys small and fibrotic. No malignant or other new growth found anywhere. The weight of the principal viscera was as follows: heart, 12¾ oz.; right lung, 27¼; left, 25; liver, 40; kidneys, right 3, left 2½: spleen, 5¼.

Of the head, but especially the cranium, I wish more particularly to speak, for the latter presented a remarkable, and in some respects, I believe, an almost unique appearance. From a photograph of the head, taken after death, the largeness of the upper part of the face, with the high forehead, is readily recognisable (Plate XIII., Fig. 1). There is an absence of any marked superciliary ridge, and the brow rises almost perpendicularly up for a great distance. The whole of the upper part of the head is enlarged; the increase in size is not limited to the bones forming the cranium, for the superior maxillary bones were more massive than natural, and both the malar and nasal bones were large and thickened. This increase in size of bones around the orbits has not taken place at the expense of the cavities. These are large, round, and smooth, and seem distinctly increased in size from expansion of the bones outwards in all directions. Thus the increase in width of the nasal bones has lengthened the distance between the two eyes, without diminishing the size of their sockets.

Very peculiar, and characteristic, too, of osteitis deformans, is the lengthening that takes place in the nose; this is well seen in this case, as well as the increase in width of the upper lip, which is also thickened and slightly everted at its edge. The ears are perhaps a little increased in size, but the most marked change in the pinnæ is a displacement backwards of the upper portion, so that the ears have a greater obliquity upwards and backwards than is natural, a position evidently resulting from an increase in size of the zygomatic arch, which stands out prominently. The cartilage of the ear is slightly hypertrophied, but particularly the tragus. None of these changes affect the lower jaw or lip, and the inferior maxillary bone gives one rather the idea of atrophy, in contrast with the general hypertrophy that has taken place elsewhere in the facial structures. The chin is small and pointed.

The facial muscles are distinctly wasted, there is an absence of adipose tissue, and the skin has a coarse, rough aspect. The eyes are deeply situated in the enlarged sockets, there is an entire absence of swelling or œdema of the eyelids. The hair of the scalp is somewhat scanty, especially anteriorly, and is slightly grey.

On removal of the calvaria, the brain was found well developed, of fair size, and weighed 42¼ oz. It was a little softened, but there was no localised wasting or sign of old hæmorrhage; the lateral ventricles a little dilated. The medulla and pons normal. No excess of cerebrospinal fluid. The pia-arachnoid appeared normal, being neither thickened nor adherent, and the vessels at the base were healthy. The pituitary body was small, and of normal appearance. The dura mater was thickened, but stripped fairly readily from the bone. Attached to this membrane on its inner surface by a slender stalk, and situated over the hinder part of the brain, was a small, flattened, circular growth, ½ in. across and ⅛ in. in thickness. It was firm and fibrous, and microscopic examination proved its nature to be that of a small endothelioma, in which the outer part was composed of fibrous tissue in bands, and the more central portions of connective tissue-like cells irregularly formed into whorls. There were a number of small calcareous masses scattered about the growth. This small tumour, as is invariably the case with such growths, presented no sign of malignancy, and probably was a mere accidental association with the conditions present in the skull.

I now come to speak of the condition of the bone surrounding the cranial cavity itself, which to my mind forms the most interesting feature of the case. It was at once discovered, when sawing through the skull, that the bone was very greatly hypertrophied, but this thickening was not accompanied with any increased density in the osseous tissue, but the latter if anything diminished to some extent.

After removal of the brain, a very peculiar sight attracted attention, when looking at the base of the skull. In place of the slightly convexed orbital plates forming the floor of the anterior fossa, there are on either side large bony masses occupying the greater part of this portion of the skull. These are smooth round bosses, forming part of the actual outer and anterior walls of the cranium, and pass up into the skull-cap that has been removed. That on the left side is a trifle the larger. The bases of these masses reach to within ⅜ in. of each other. Between these lies the crista galli, which is small and depressed; the left mass touches the edge of this prominence, but the right is separated by a narrow space, in which the thin plate of the cribriform bone is considerably depressed. Between these, in front, a broadened prominent frontal crest projected. Posteriorly, the bony masses reach almost to the edge of the orbital plates. The extent and character of these osseous masses can be better understood by a glance at the accompanying illustration, than by a more detailed description (Plate XIV., Fig. 2).

The middle fossæ present an unsymmetrical appearance, that on the left side being the more normal; it is larger and shallower than the right. The latter is nearly ¼ in. deeper than the former, and is 1⅝ in. in depth from the line of section. The diminished area of the right fossa is due to greater increase of the outer thickening of the cranial wall on that side, and more backward position of the edge formed by the orbital plate and lesser wing of the sphenoid. This edge on both sides is less sharp and more rounded than in the normal skull. The floor of these fossæ is fairly smooth. The pituitary fossa is small and deep, and the olivary eminence in front is raised and nodular. The foramina for nerves and vessels are not encroached upon by the bony growth.

The posterior fossa is more symmetrical in form. On the whole, the thickness of the occipital bone is rather less than the parietal and frontal. The floor is smooth, but there is marked prominence and thickening of the internal occipital crest, thickening and rounding of the bone around the foramen magnum, and thickening of the free edge with its clinoid processes of the dorsum sellæ, which stands up prominently above the anterior clinoid processes.

The extent and direction of thickening of the bone, and the character of the new osseous formation, can be studied equally well on the calvaria that has been removed (Plate XIV., Fig. 3). The bone is greatly thickened around the whole circumference of the cranial cavity, but not everywhere to an equal extent. In the frontal region it is increased most on the left side, but in the parietal it is considerably more on the right; the occipital appears about equally affected on the two sides.

The bone is of a uniform character throughout, there is no distinction of an inner and outer table and intervening diploe. It is of a slightly porous character, but with no large cancellous spaces. The whole wall is firm and well ossified, a little denser on the inner side. There was no sign in the fresh state, either of infiltration with malignant growth, or localised tumour formation throughout the skull. When dry, however, the section of calvaria presents in places a somewhat mottled appearance, but all parts are equally firm.

On removing the dura mater, the inner surface of the skull-cap on either side is seen to be deeply furrowed by the grooves for the middle meningeal artery. The depressions for the pacchionian bodies are increased in size, and the inner table is studded over with large foramina for vessels. There is an entire obliteration of all sutures, both outside and inside the skull. A broad, slightly raised longitudinal ridge runs the length of the calvaria, arising in front from a prominent frontal crest, and blending behind with a marked occipital crest. A particularly deep canal, in places as much as ⅛ in., takes the place of the larger groove that normally exists towards the anterior-inferior angle of the parietal bone. As this groove forms one of the most fixed landmarks on the side of the cranial wall, it will help us to form some idea of the cranial capacity in this particular case, and to see whether the actual brain space has been encroached upon by the new bony deposit.

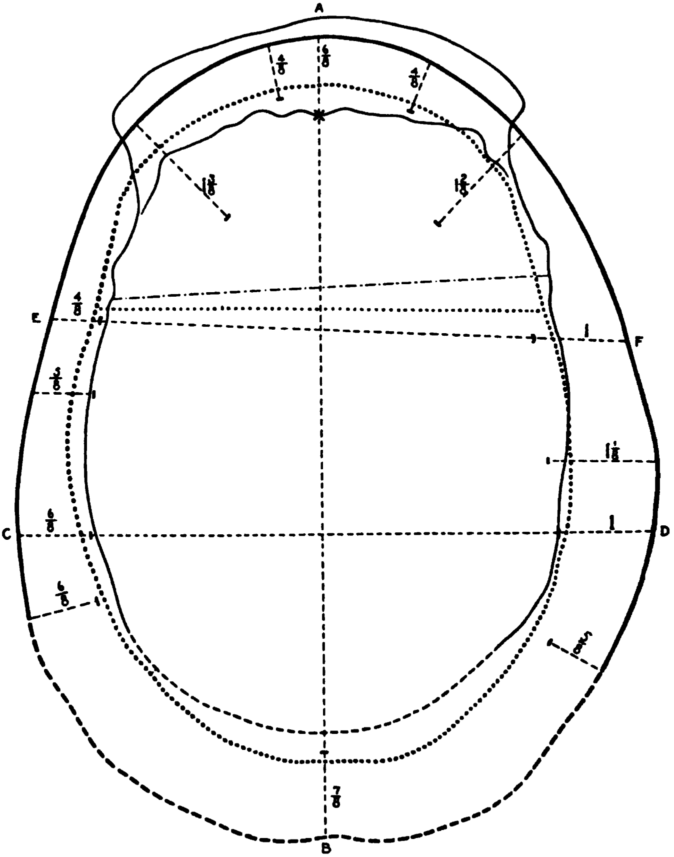

FIG. 1.—Outline of three calvaria at line of section (reduced to half natural size). Thick line = *osteitis deformans* (Case 1), thin line = *acromegaly* (Case 1), dotted outline = *female lunatic* (of which dimensions are given on p. 395), AB = anterio-posterior median line, CD = line of greatest breadth, EF = line connecting main meningeal grooves. The continuous line represents that portion of the calvaria that has been removed, and the cranial outline is completed by a broken line. The figures give the thickness of bone in inches of the case of osteitis deformans. In the acromegaly skull-cap, both inner and outer tables of frontal bone are indicated. × is the fixed point for all three calvaria, and corresponds to the edge of the frontal crest.

It is obvious at first sight that the outer wall of the cranium far exceeds the normal in dimensions and circumference. But whether it is solely an outward growth of the bone, can only be decided by careful measurements. A straight line connecting the crista galla with the occipital crest will be found to pass through the centre of the pituitary fossa and foramen magnum; another line, drawn at right angles across the wider part of the skull, passes slightly in front of the centre of that foramen; a second transverse line connecting the main groove of the middle meningeal artery at the line of section, which, in a perfectly symmetrical skull, would cut the antero-posterior line at right angles, in this case is seen to pass obliquely backwards on the right side (see Figs. 1 and 2). The following are some of the principal measurements of the thickened cranium, compared with those of a fairly normal skull, from a female lunatic,[1] æt. 58, who died after mania of twenty years' duration, and whose brain weighed 42 oz. The distances are given in inches:—

	External.	Internal.	External.	Internal.
EXTERNAL DIMENSIONS OF CRANIUM.				
Greatest circumference of skull—				
Right side . . . . . 12⅜ Left side 11⅝	24	...	19¾	...
Distance from ophryon to occipital point .	12¼	...	10	...
Distance from ophryon to highest point of skull	7½	...	6¼	...
Distance transversely over calvaria from line of section at greatest width of skull	10¼	...	8¾	...
Distance transversely over calvaria, from line of section at meningeal grooves .	9¼	...	7⅞	...
HORIZONTAL DIAMETERS AT LINE OF SECTION.				
Greatest length (ophryon to occipital point)	8⅜	6⅝	7	6½
Greatest breadth (biparietal)	6⅝	4⅞	5¼	5
Breadth at line connecting the main meningeal grooves	6	4½	4¾	4½
INTERNAL CAPACITY.				
Depth of middle fossa from line of section—				
Right	...	1¼	...	1⅝
Left	...	1⅜	...	1⅞
Height of highest point of vault of skull from line of section	3⅝	2⅞	3	2⅝

On referring to Fig. 1, it is seen that there is greater width of skull to the right of the central line. This increase is found to result from bony deposit on the exterior of the skull, for both at the line of greatest breadth, and even more so at that connecting the meningeal grooves, the cranial cavity is almost equal on the two sides. To be exact, the measurements are—

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[1] This is a little small. Mr. T. W. Lawrence has kindly supplied me with a diagram of an average size calvaria from a non-insane adult female; this measures 7 in. antero-posteriorly and 5½ in. in its greatest breadth, circumference just over 20 in.

	External.	Internal.
At greatest width—Right . . .	3$\frac{4}{8}$	2$\frac{4}{8}$
,, Left . . .	3$\frac{1}{8}$	2$\frac{3}{8}$
At meningeal line—Right . . .	3$\frac{1}{8}$	2$\frac{7}{8}$
,, Left . . .	2$\frac{6}{8}$	2$\frac{3}{8}$

The capacity of the vault of the skull appears fairly uniform on the two sides. Taking, then, the foregoing figures into consideration, we may conclude that the increase in size of the cranium has almost solely taken place by growth of bone outwards, mostly on the right side; that the internal capacity of the cranium is of fair size and uniformity, and that what it has lost in one direction has been made up in another. The fact that it contained a brain fairly developed, and weighing 42$\frac{1}{4}$ oz., is proof that the cranial cavity was little if at all diminished in size.

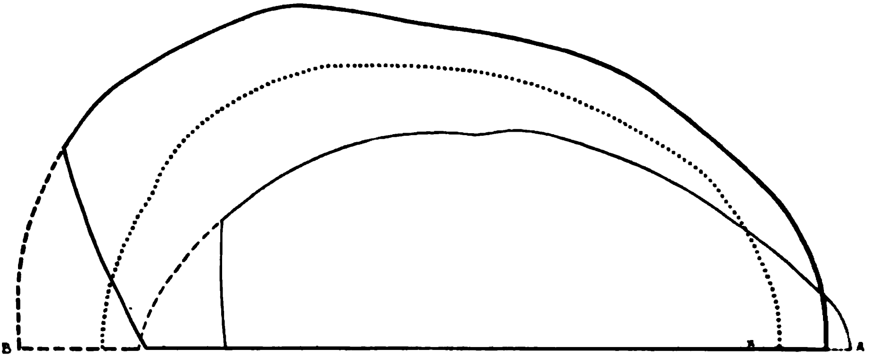

Fig. 2.—Elevation of skull-cap of the same three cases. A = anterior, B = posterior, AB = line of section. The broken line represents that portion which was not removed.

As already mentioned, the thickness of bone varies somewhat in different parts.

At the median line in front (frontal crest) . .	$\frac{6}{8}$	in.
,, a point a short distance on either side . .	$\frac{4}{8}$	,,
,, the orbital mass—right	1$\frac{2}{8}$	,,
,, ,, left	1$\frac{3}{8}$	,,
,, the line of middle meningeal artery—right .	1	,,
,, ,, ,, ,, left .	$\frac{4}{8}$	,,
,, ,, great breadth—right . . .	1	,,
,, ,, ,, left	$\frac{6}{8}$	,,

At the point where oblique line passes up—right .	$\frac{5}{8}$ in.
" " " " left .	$\frac{6}{8}$ "
" the median line, through hinder part of parietal	$\frac{6}{8}$ "
" a distance of an inch on either side . .	$\frac{4}{8}$ "
" median line, through occipital crest . .	$\frac{7}{8}$ "

Nowhere is the bone in section less than half an inch thick. In the middle of the right parietal region it reaches 1⅛ in. It is much greater than this through the osseous masses above the orbits. The section may be said, roughly, to pass between the middle and upper third of these out-growths, but they gradually slope away as they pass upwards, and have disappeared in the general thickening of the frontal bone, about an inch above the line of section; that on the right side retreats more gradually, and extends rather further, but is nowhere quite as prominent as that on the left. The base of these bosses, as they spring from the orbital plate, is 1 in. below the line of section. They have the appearance of being solid masses of bone, but it is quite possible that the prominences are largely due to an actual upheaval of the orbital roof, associated with more or less uniform thickening of the orbital plates of the frontal bone, to an extent equal to the remainder of the cranial wall; for, as was already seen, the orbital cavities have the aspect of being unmistakably enlarged. It may be that the portion of the anterior fossa which remains flat or depressed is formed solely by an enlargement of the small wing of the sphenoid, and by the ethmoid bone, the latter, seemingly, to some extent atrophied. If this be so, these bosses cannot be looked upon as of the nature of osseous tumours or exostoses.

There is no indication of any frontal sinuses; these air spaces seem to have been obliterated by the new osseous tissue.

Considering the great thickness of the portion of bone removed, it is remarkably light in weight. In the fresh state it weighed 68¾ oz. Even then it seemed light in comparison to its size; but during the process of drying it has lost excessively, so that now, eighteen months after removal, it weighs no more than 20½ oz. The loss that takes place in the skull by drying is well seen in the case described by Fielder,[1] where the weight of the entire skull fell from 83 to 51 oz. This case, too, enables us to estimate approximately the difference in circumference between the head whilst living and the dry skull; the former was 25¾ in., the latter 24 in.—a difference of 1¾ in. The circumference of the large head of osteitis deformans has been variously given from 25¼ to 27¼ in.

Taking the skull as a whole, it is those portions which are developed in membrane that are most conspicuously affected by the changes of osteitis deformans, for the bones least altered are invariably found to be the sphenoid, petrous, and mastoid, and the lower portion of the occipital. The inferior maxilla in this disease, unlike acromegaly, is only rarely involved.[1] Whether the above fact has any bearing on the seat of selection of the osseous overgrowth, it is difficult to say, for the same bones form the fixed base of the skull, and it is the other bones which naturally expand with varying conditions of the cranium. In may be noted, however, that the thickening which occurs in the long bones would seem to be a subperiosteal deposit of new bone.

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[1] *Trans. Path. Soc. London*, 1896, p. 190 (R. C. S. Museum, 1241 Bk.).

The peculiar condition of the anterior fossa of the skull that existed in this case must be extremely rare. I know of no similar recorded specimen, nor was I able to find anything of the kind in the museum of the Royal College of Surgeons, or in the museums of several London hospitals in which I searched. Moreover, Mr. Shattock informs me he has seen nothing exactly like it. Certainly the condition does not seem to be common with osteitis deformans. I have looked over a good deal of the literature in this country bearing on that disease, but have found no description in any way resembling it. Post-mortem accounts are as yet few, but in those where the condition of the frontal region of the skull has been described, it has invariably been stated that the orbital plates of the frontal bone were flat and unchanged, and show no bony overgrowth.

At the Royal College of Surgeons are two entire skeletons, a male and a female. In both instances the orbital plates remain flat, or, if anything, slightly depressed. The calvaria of each is uniformly thickened, without any apparent malignant growth in the bone; there are no bony masses protruding into the cranial cavity. Apart from these skeletons the disease is poorly represented; the only other parts of the skull are portions of two thickened calvaria, both of which show cancerous growth in the cancellous tissue.

In recorded cases of what are called leontiasis ossea of the skull (Virchow), there is an enormous overgrowth of the bone in an outward direction; the osseous tissue is sometimes cancellous, but often exceedingly dense and compact. The hypertrophy seems to attack by preference the bony structures in the neighbourhood of the nose, producing great deformity of the face, as seen in cases recorded by Young,[2] Noble,[3] and Bennett.[4] Most published accounts have been of persons living; but it seems of those that have died, the cranium has been found normal within, and there was no encroachment on the cranial cavity by bony masses; in some cases, however, the cranial bones, especially the occipital, have been principally affected, as in the case published by Hale White.[1] The enlargement of the cranial portion of the head and upper part of the face gives to a full-face portrait of this patient an appearance closely resembling the facial aspect of osteitis deformans, and it is quite possible that some of these cases are of the same nature as that disease; besides, in Hale White's case, there are other signs to indicate that the disease was more general to the osseous system, and not confined to the skull bones. Again, as with osteitis deformans, some of these growths appear to be pure bony thickenings, or outgrowths resembling enormous diffuse exostoses; others again, such as Noble's case, as pointed out by Roger Williams,[2] are of a malignant sarcomatous nature.

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[1] Such cases have been described by Barlow (*Lancet*, London, 1882, vol. i. p. 1035) Goodhart (*ibid.*, 1885, vol. i. p. 519), and Haviland Hall (*Brit. Med. Journ.*, London, 1896, vol. i. p. 975).

[2] *Brit. Med. Journ.*, London, 1896, vol. ii. p. 1303.

[3] *Ibid.*, 1896, vol. ii. p. 1637.

[4] *Ibid.*, 1897, vol. i. p. 1163.

As already stated, the ordinary hypertrophy of the cranial bones in the insane is much more common in women, and in an excessive degree is almost confined to them; the majority of recorded cases of hyperostosis cranii, however, have been of the male sex. Osteitis deformans seems to be almost equally frequent in the two sexes; in acromegaly the female sex predominates to the extent of nearly half as many again; in hypertrophic osteo-arthropathy only one or two females have been referred to. In myxœdema, tested by published cases that have undergone thyroid treatment, males are 10 to 12 per cent. of those affected by the disease.

26,300 patients have been admitted into Colney Hatch Asylum since it was opened in July 1851; of these, 12,800 were men and 13,500 women. Of those that have died there is a post-mortem record of 2500 male cases and 2200 female cases. Amongst this large number I have been able to discover only two other cases of what appear to be osteitis deformans. Both of these were women.

CASE 2.—*Osteitis deformans.*—FEMALE, 8422, æt. 32; died 23rd March 1883. On admission to the asylum in January 1882, she was said to be single, of temperate habits, and the duration of her mental attack was then of two weeks' duration. She was thin, and her body weighed 6 st. 13 lb. It was noted that she was of a low mental type, her head was irregular in shape, forehead wide, small features, and sharp chin. Eyes wide apart, and there was divergent strabismus. She was noisy, excited, and rambling in her speech; talked rapidly and loudly, and wandered from one subject to another; made use of disgusting language, and accused herself of having been a drunkard.

For some months she remained in a maniacal condition, talked loudly and at random, filthy in her expressions, and at times very violent. In June she was quieter and somewhat hysterical, full of small ailments, and dressed herself up in rubbishy finery; very vain and weak-minded. No catamenia had been seen. Occasionally did some needlework. In this condition she remained until the following

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[1] *Brit. Med. Journ.*, London, 1896, vol. i. p. 1377, with references.

[2] *Ibid.*, London, 1897, vol. i. p. 59.

March, when she became quite melancholic, hardly spoke, and refused food, at times having to be fed by force. She emaciated, developed into a semicomatose condition, with retention of urine, and died from exhaustion of melancholia with pneumonia.

An examination of the head only was made. The calvaria was congested. On removing the skull-cap, the whole anterior fossa of the base of the skull was found filled up by a cancellated bony growth continuous with the frontal bone. It was soft and easily cut through, with here and there patches of a fibro-cartilaginous nature. The whole growth being fully 2 in. in thickness, and extending back to the anterior clinoid processes of the sphenoid. Brain substance much congested, ventricles but little dilated. Membranes injected, especially at the base, not thickened or adherent. Arteries healthy. No excess of cerebro-spinal fluid.

The case is recorded as one of osteoid sarcoma of the base of the skull. No reference is made to the condition of other parts of the skeleton, or any deformity of the limbs. In the second case, however, there was distinct deformity of the leg bones, associated with very definite malignant growth in the frontal region of the skull. This is referred to as a case of osteitis deformans in the post-mortem book.

CASE 3.—*Osteitis deformans.*—FEMALE, 6166, æt. 64, died August 1887. She was admitted into the asylum in April 1876; was single, and the mental attack then of two months' duration. Was said to be in fair bodily health and condition; weight, 7 st. 10 lb.; mental powers weakened; low-spirited and miserable; wandering in her habits, and had aural hallucinations and delusions. She continued quiet, melancholic, did a little ward work, and had good health. In November 1879 she is said to have had epileptic fits, and these are noted as occurring during the following year. In 1883 it is stated that she was simple and deluded, and was never employed. She constantly sat on a settee, with her feet under her, in a very unbecoming position. July 1884 she was very low-spirited and melancholy. There had been no fit for some two years or more. She sat listlessly unemployed in one place; bodily health remained fair. From this time up to July 1887 the notes record but little change in her condition. It is then said that a tumour, which first appeared two months previously in the middle line of the forehead, and at first had increased but slowly in size, had now for the past few weeks taken on more rapid growth. She had taken iodide of potassium, 5 grs., three times a day, without any appreciable result on the tumour. The tumour gave a sensation of fluctuation on palpation, but on exploring with a hypodermic needle nothing but blood was extracted. Lately the patient had complained of pain in the back of the head and a dragging sensation in the eyes. She was confined to bed, although she seemed in good health otherwise. Mentally she was more demented, but aural hallucinations were very marked, and she would talk to people whom she believed were about her. She had seldom spoken to or associated with her fellow-patients. Before death she passed into a state of stupor.

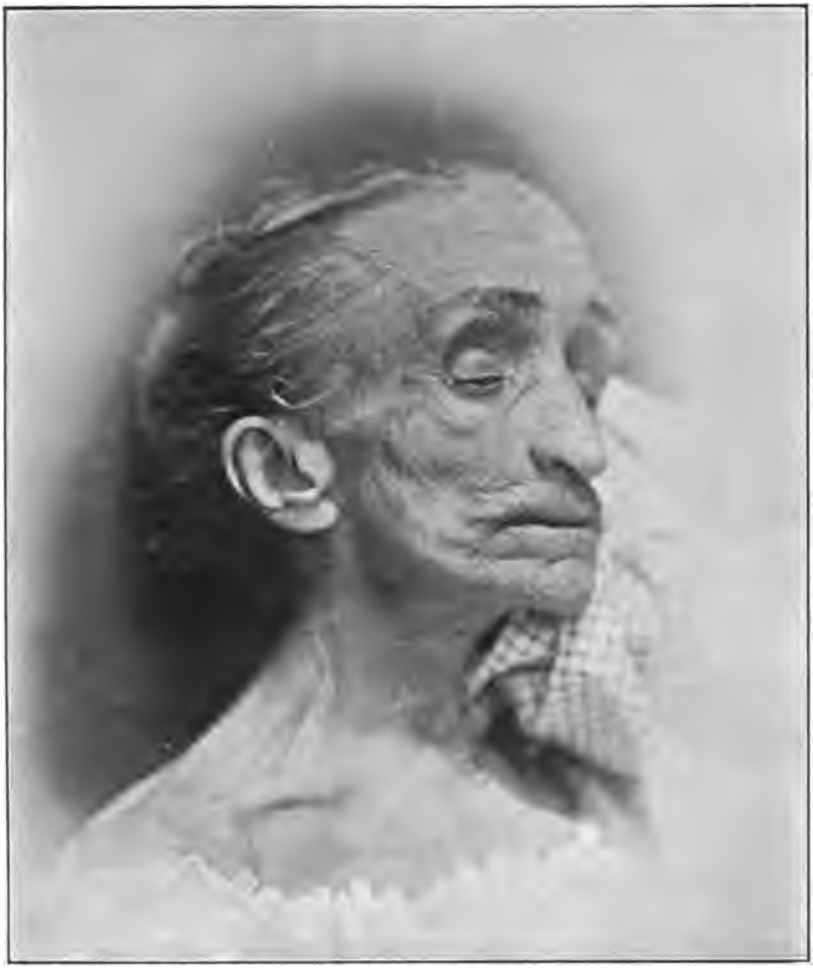

Fig. 1.

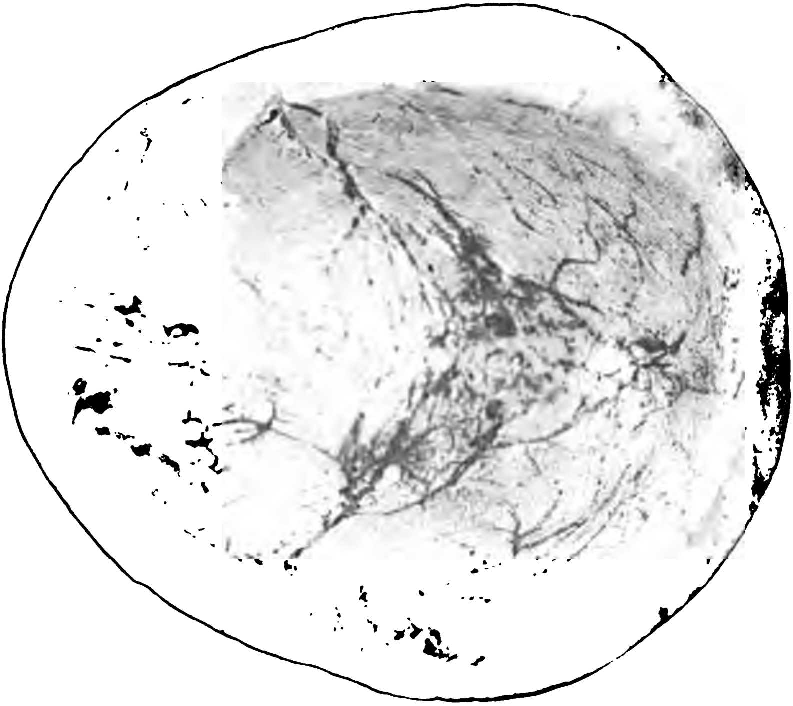

FIG. 3.

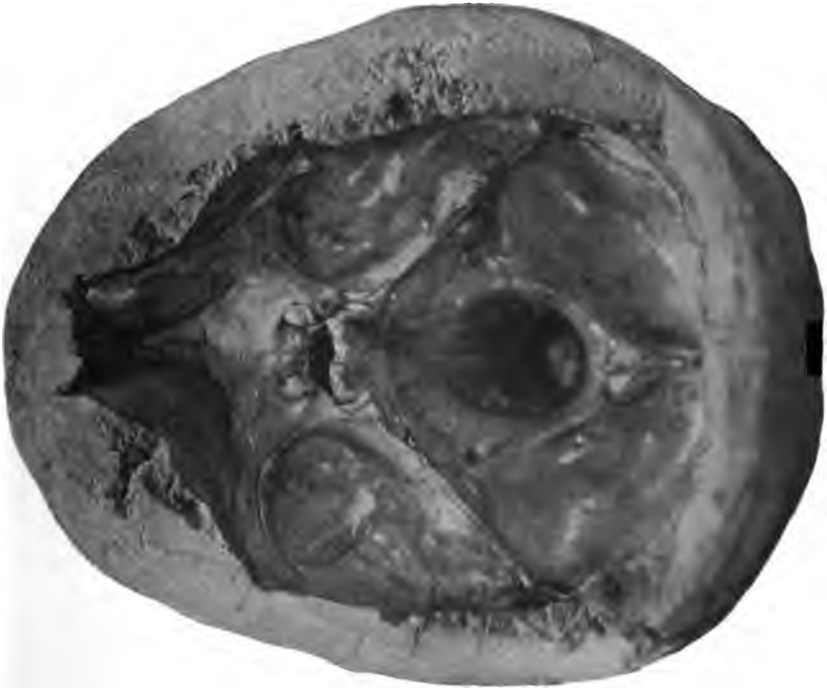

FIG. 2.

The head only was examined. The skull was "hydrocephalic," with a tumour over the middle of forehead. Calvaria throughout was thick, dense, and vascular, softened in places, especially the frontal bone; it was 1 in. wide in its thickest part. Dura mater thickened, membranes congested, brain small and softened. After reflexion of the scalp over the frontal bone, a fungating tumour was found about the centre, which protruded through the bone and was attached to the frontal lobe of the right hemisphere of the brain, extending backwards almost to the ascending frontal convolution. It involved the central portion of the frontal lobe, and hæmorrhage had taken place into the posterior part of the growth. The fungating portion contained four or five blood cysts, elsewhere was firm, and on section appeared fibrous with hyperæmia. The bone round the base of the tumour was thinned and readily broken. The body was fairly nourished, and was free from sores. The thigh bones were large and irregular in shape.

(To be continued.)

THE EARLY DIAGNOSIS OF CANCER OF THE STOMACH.[1]

By W. SOLTAU FENWICK, M.D. (Lond.), M.R.C.P., *Physician to the London Temperance Hospital and to the Evelina Hospital for Sick Children.*

(Concluded from page 262.)

IN cancer of the cardia the passage of the tube gives rise to a sense of discomfort, but seldom to actual pain. The end of the instrument appears to be quite free above the point of obstruction, and can be rotated or withdrawn without any feeling of resistance. The quantity and quality of the material extracted varies with the degree of stenosis and the condition of the new growth. If the obstruction is considerable, the part of the œsophagus immediately above it becomes dilated and capable of retaining several ounces of food and saliva; but in less severe cases the quantity does not usually exceed a drachm or two. The material itself is alkaline in reaction, and contains an excess of mucus mixed with particles of undigested food. In advanced cases it may possess a fœtid odour, and largely consist of muco-pus. Blood is frequently present, either in the form of bright red streaks, or blackened and changed by decomposition. Under the microscope numerous salivary corpuscles and masses of food can be detected, and in many cases particles of the morbid growth may be recognised by the characteristic appearance of its cells.

If the symptoms depend upon simple ulceration, exploration with the tube usually gives rise to severe lancinating pains in the chest and back, which continue for some time. Occasionally the tube can be passed into the stomach without difficulty; but, as a rule, spasm of the lower end of the œsophagus is set up, and the tube is felt to be firmly grasped. The quantity of material extracted is insignificant, except in those chronic cases where cicatrisation of the ulcer has given rise to an organic stricture, and chiefly consists of mucus and saliva. Blood is occasionally present, but it is always bright in colour and is unmixed with pus or products of decomposition. The microscope reveals nothing of importance.

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[1] Abstract of a lecture delivered at the London Temperance Hospital, 11th November 1897.

In cases of simple spasmodic stricture, the employment of the tube gives rise to no pain. The obstruction varies from time to time, and it is often possible to reach the stomach by a little perseverance, or by exerting pressure while the patient makes forced expiration with the glottis closed. The lower end of the œsophagus rarely contains more than a drachm or two of saliva, and blood is never found in the material extracted by the tube.

Examination of the abdomen seldom affords any clue to the nature of the disease, the stomach being contracted from partial disuse, and often difficult to differentiate from the transverse colon. In one remarkable case which came under my notice, a hard and tender tumour was discovered in the left hypochondrium of a man who for several months had suffered from severe pain immediately after food, with uncontrollable vomiting and frequent attacks of hæmatemesis. After death, the tumour was found to consist of the stomach, which was contracted to the size of an orange, while the cause of the symptoms was discovered in a simple ulcer of horse-shoe shape, embracing two-thirds of the circumference of the cardiac orifice.

2. *Cancer of the body of the stomach.*—The principal diseases with which cancer of the body of the stomach is likely to be confounded are simple ulceration and pernicious anæmia. Both cancer and chronic ulcer occur about the same period of life, and in rare instances they may coexist. It is to be observed, however, that in simple ulcer the local symptoms invariably precede the constitutional in point of time, and consequently pain after food, vomiting, and hæmatemesis have usually existed for a considerable time before anæmia, debility, or loss of flesh claim attention. In cancer, on the other hand, the general phenomena are often the first to attract the notice of the patient or his friends, and it may be only on careful inquiry that a history of dyspepsia is ascertained. The symptoms of simple ulceration also vary in their character and severity with the nature of the food, and if the patient is restricted to a milk diet the pain and vomiting usually subside spontaneously; while, after a few weeks, it is often possible to allow semi-solid food without ill effects. But in cancer of the stomach attended by symptoms of like severity, the pain is never cured by recourse to a liquid

TABLE I.—*Differential Diagnosis of Cancer of the Cardiac Orifice.*

Disease.	Sex.	Age.	Etiology.	Duration.	Pain.	Vomiting (Regurgitation of Food).	Loss of Flesh.	Anæmia.	Hæmatemesis.	Deglutition Sound.	Passage of Tube.	Contents of Œsophagus.
Cancer .	Males.	Over 40.	Often cancer in family.	Several weeks.	Moderate. At first only on swallowing; afterwards continuous.	Develops gradually and steadily increases.	Rapid and continuous.	Rapid and progressive.	Occasional; small in quantity.	Delayed or absent.	Little pain; only those of small calibre pass; stenosis rapidly increases.	Alkaline; much saliva and mucus; undigested food; traces of blood; perhaps pieces of cancerous tissue.
Simple ulcer	Males.	20–40.	Corrosive poisoning; cirrhosis of liver; gastric ulcer.	Many months.	Severe, but only on swallowing.	Chiefly after solids; varies.	Gradual; varies with severity of vomiting.	Often absent; no cachexia.	Occasionally profuse; melæna.	Somewhat delayed.	Often severe pain; stenosis seldom complete, unless spasm co-exists.	Saliva and mucus; food; seldom blood; no cancer cells.
Tonic spasm	Females.	20–40.	Blow on chest; neuroses; alcohol; anæmia.	Mouths; perhaps previous attacks.	Absent, or discomfort after swallowing.	Irregular; often disappears for a time.	Varies.	Antecedent if present.	None.	Varies from day to day.	No pain, but often hysterical symptoms; tube may be grasped by muscle; spasm overcome by pressure during forced expiration.	Nil, or a little mucus and saliva; no blood or cancer cells.

diet, and in the majority of cases fresh milk disagrees, unless previously diluted or peptonised. When this stage has been reached, the power of digestion is never recovered, and any subsequent attempt to introduce semi-solids into the dietary at once provokes a relapse. In a suspicious case the continued inability to digest fresh milk is therefore highly suggestive of malignant disease. The pain in gastric ulcer is usually stated to be of a severe, stabbing character, and to occur within half an hour of a meal; its principal seat being in the epigastric region, whence it radiates over the chest and back. It is increased by pressure, but relieved by vomiting and hæmatemesis. In not a few cases, however, the greatest suffering is experienced when the stomach is empty, and is relieved rather than increased by taking food; or perhaps a constant aching pain is felt in the lower dorsal spine, which disappears for a short time after the ingestion of milk.

These symptoms usually accompany adhesion of a chronic ulcer to the pancreas or diaphragm, and appear to depend upon the coexistence of hypersecretion. In such cases the appetite remains good, the loss of flesh has been very gradual, the tongue is clean, there is no cachexia, and the history points to a duration of many months or even years. When cancer of the stomach is accompanied by constant pain in the abdomen or back, this symptom is aggravated rather than relieved by the ingestion of food, the appetite is absent or the patient loathes the sight of meat, there is marked loss of flesh and progressive anæmia, and the tongue is pale and covered with a creamy fur. Vomiting is an inconstant phenomenon in both affections, but when it occurs in ulcer it usually follows a meal; while in cancer repeated retching or vomiting of mucus may take place in the early morning or at other times when the stomach is empty. Hæmatemesis is common in both diseases, but in ulcer the bleeding is profuse, irregular in its appearance, and is followed immediately by amelioration of the other symptoms; while in cancer the repeated appearance of small quantities of altered blood in the vomit is the rule, and severe bleeding the exception. The presence of a nodular tumour in connection with the stomach usually settles the diagnosis in favour of cancer, but its absence does not in any way negative the supposition of malignant disease. Lastly, in all cases, the stomach should be explored with a tube, and its secretory functions investigated after by the administration of a test meal. If chronic ulcer is present, the chyme usually contains a considerable quantity of free hydrochloric acid, while lactic acid is either absent or insignificant in amount. In cancer, free hydrochloric acid is seldom present, and never in excess, unless the disease is associated with simple ulcer, but lactic acid exists in considerable quantity. Simple ulcer runs a protracted course, and may persist for thirty years or more; cancer usually proves fatal within twelve months.

Cancer of the stomach is most liable to be mistaken for pernicious anæmia when it attacks the posterior wall of the organ. Both diseases develop about the same period of life and last for the same length of time, while debility, anorexia, anæmia, and dyspepsia are symptoms common to both complaints. It should be observed, however, that in pernicious anæmia the patient does not lose flesh; on the contrary, he often increases in weight, and the abdominal parietes are found to be thickly covered with fat. In cancer of the stomach loss of flesh is one of the earliest and most important symptoms, and when once it has begun it progresses rapidly. In pernicious anæmia, the increasing pallor of the face is usually the first symptom which attracts attention, and is accompanied by dyspnœa on exertion, thirst, palpitation, and œdema of the ankles. In cancer of the stomach the gastric symptoms invariably precede the development of anæmia, thirst is seldom complained of, while palpitation and œdema of the extremities only occur at a late stage of the complaint. The dyspeptic symptoms which accompany the idiopathic form of anæmia consist chiefly of discomfort after food, flatulent distension of the abdomen, or attacks of retching and vomiting, which appear every few weeks, and are attended by an elevation of the temperature and the elimination of much dark pigment in the urine. When the body of the stomach is attacked by carcinoma, pain is seldom absent, and is usually constant and severe. Vomiting may occur either after food or when the organ is empty, but the symptom never exhibits any periodicity of recurrence. The temperature of the body is always subnormal, and in uncomplicated cases fever is practically unknown. The appearance of altered blood in the vomit is exceedingly rare in pernicious anæmia, but is of frequent occurrence in malignant disease. In both diseases there is a marked diminution in the secretion of hydrochloric acid, with a tendency to fermentation of the food; but these defects occur at a much earlier stage in gastric cancer, and are always more pronounced in that complaint. The detection of minute pieces of cancerous tissue in the washings of the stomach is, of course, diagnostic. In all cases the blood should be carefully examined. In pernicious anæmia the red corpuscles are greatly diminished in number, and present many abnormal shapes and sizes, while the amount of hæmoglobin is also greatly reduced. This alteration in the quality of the blood is accompanied by a tendency to hæmorrhage into the retinæ, which can be easily recognised with the ophthalmoscope. In cancer of the stomach the blood never undergoes qualitative changes to the same extent, variations in the shape of the red corpuscles are uncommon, and retinal hæmorrhages are extremely rare.

3. *Cancer of the pylorus.*—This disease is most liable to be confounded with chronic gastritis and benign stenosis of the pyloric orifice. The clinical distinction between commencing

TABLE II.—*Differential Diagnosis of Cancer of the Body of the Stomach.*

Disease.	Pain.	Vomiting.	Anæmia.	Dyspnœa.	Loss of Flesh.	Appetite.	Hæmatemesis.	Physical Signs.	State of Blood.	Temperature.	Contents of Stomach.
Cancer .	Usually constant; aggravated by food.	Irregular; worse after food: does not relieve the pain.	Cachexia follows the gastric phenomena.	Slight or absent.	Severe and progressive from commencement.	Absent: no thirst.	Frequent; small in quantity.	Resistance and pain on pressure over epigastrium; or nodular tumour.	Red corpuscles and hæmoglobin slightly diminished.	Subnormal.	No free HCl; excess of lactic acid; pieces of cancerous tissue.
Ulcer . .	Rarely constant; acute after food.	Only after food; relieves the pain.	Absent, except after hæmorrhage.	Absent.	Slight.	Good; but patient afraid to eat.	Occasional but profuse.	Pain on pressure; no tumour of stomach.	Normal.	Normal.	Excess of free HCl.
Pernicious anæmia.	Discomfort or distension after meals.	Periodic; the attacks lasting several days, and often independent of food.	Severe; progressive; precedes other symptoms.	Severe on exertion.	Absent.	Diminished; great thirst.	Absent.	Stomach often dilated; no tumour or tenderness.	Great diminution of red corpuscles and hæmoglobin; poikilocytes.	Periodic attacks of fever.	Free HCl diminished; lactic acid at a late stage.

malignant disease and simple chronic inflammation of the gastric mucous membrane is always a matter of considerable difficulty, inasmuch as the earliest symptoms of the cancerous disease arise from the gastric catarrh which invariably accompanies it. In every case of chronic gastric catarrh occurring after the age of 40, a careful search must be made for the exciting cause of the complaint. If there is no reason to suspect that the disorder depends upon unduly rich living or abuse of alcohol, it is most probable that it arises from disease of some organ other than the stomach, and accordingly the condition of the heart, lungs, liver, kidneys, and bladder requires investigation. In the great majority of cases some morbid condition can thus be detected which is of sufficient gravity to account for the gastritis, and when treatment is directed to this cause, the disorder of the stomach rapidly improves. On the other hand, if the cause of the gastritis remains a mystery, and especially if the patient has lost flesh and strength, or appears anæmic, the possibility of malignant disease must be kept prominently in mind. It is also important to remember that in cases of simple gastritis, the appetite, except for the morning meal, usually remains unimpaired; thirst is often excessive, and emaciation, loss of energy, and anæmia are either absent or insignificant symptoms. In the gastritis of cancer, on the other hand, the appetite is diminished or entirely absent; there is no special thirst, but the patient rapidly loses flesh and strength, and exhibits a marked degree of anæmia. Dilatation of the stomach may occur in both complaints, but it is seldom a marked feature of simple gastritis, while in cancerous disease of the pylorus it is present from the commencement, and soon attains a high degree. The employment of the tube in a case of simple gastritis demonstrates that the fasting stomach contains only a few centimetres of a turbid fluid, which is either alkaline or faintly acid in reaction. Lactic acid may be present, but free hydrochloric acid is rarely encountered. There is usually an excess of mucus when the organ is washed out, and small pieces of detached mucous membrane may often be detected in the sediment. After a test meal the contents of the stomach are largely mixed with mucus, the total acidity is diminished, and free hydrochloric acid is either absent or greatly diminished. Lactic acid may be present, but it never exists in large quantity. When a stomach affected with cancer of the pylorus is examined in the early morning, a considerable amount of undigested food is usually evacuated, and occasionally some distinctive article of diet (grapes, currants, vegetables) which were eaten some days previously can be detected. The contents possess a sour smell, owing to the presence of lactic and other organic acids, but free hydrochloric acid is invariably absent. Under the microscope, numerous sarcinæ, slender bacilli, and blood corpuscles can often be observed. After a test meal the quantity of material evacuated

TABLE III.—*Differential Diagnosis of Cancer of the Pylorus.*

Disease.	History.	Pain.	Vomiting.	Appetite.	Hæmatemesis.	Anæmia.	Physical Signs.	Contents of Stomach.
Cancer. .	Often cancer in family.	Moderate but continuous; slightly increased by food.	Profuse; irregular in onset.	Absent.	Occasional black vomit, rare in any quantity.	Marked and progressive.	Stomach dilated; perhaps tumour of pylorus; later, visible peristalsis.	Acidity diminished; no free HCl; excess of lactic acid; numerous slender bacilli.
Chronic gastritis.	Alcohol; heart, lung, or kidney disease.	Distension and discomfort after food.	Chiefly in early morning or after breakfast.	Deficient in morning; later, capricious or voracious.	Absent.	Pallor of face, but seldom general anæmia.	Only slight dilatation of stomach; tenderness over epigastrium; no tumour or visible peristalsis.	Free HCl diminished or absent; occasional lactic acid; excess of mucus in early morning.
Benign stenosis.	Formerly dyspeptic symptoms; hæmatemesis or melæna.	Often when stomach free from food, and then relieved for a time by a meal.	At intervals; profuse.	Often extreme hunger.	Very occasional, but then profuse.	Usually absent.	Stomach markedly dilated; visible peristalsis; no distinct tumour.	Acidity excessive; much free HCl; lactic acid absent or in small amount.

by the tube is greatly in excess of the normal, and is devoid of free hydrochloric acid, but contains a large amount of lactic acid.

After a fortnight's careful treatment, the distinction between the two diseases becomes more apparent. In simple gastritis the appetite improves, the tongue cleans, nausea and vomiting cease, and the patient does not exhibit any loss of weight; while a careful increase of the diet does not provoke a recurrence of the former symptoms. But in cases of cancer, the progress, with slight intermissions, is always from bad to worse. The patient fails to gain in weight, the anæmia and debility increase, the appetite remains in abeyance, and any attempt to return to a normal diet causes an immediate relapse. It may therefore be accepted as a practical rule, that the occurrence of chronic gastritis without definite cause in a person over 40 should always be regarded with suspicion; if at the end of a month the complaint has not yielded to careful treatment, or if the patient has continued to lose flesh, and suffers from pain or vomiting after the use of fresh milk, while the stomach contains food in the early morning without free hydrochloric acid, the presence of malignant disease may be regarded as a certainty, even in the absence of a tumour.

The diagnosis between malignant and benign stenosis of the pylorus does not, as a rule, present much difficulty. The latter disease generally depends upon the cicatrisation of an ulcer, and consequently there is almost always a history of pain after food, with vomiting, hæmatemesis, or melæna. The patient, though thin and weak, does not exhibit the extreme anæmia which accompanies cancer. The stomach is always markedly dilated, and peristaltic movements are usually visible. It is rare for benign stenosis to be accompanied by a tumour, but on more than one occasion I have felt a sausage-shaped swelling in the region of the pylorus, which was subsequently proved to arise from hypertrophy of the wall of the stomach.

In both diseases retention of food occurs, but the contents of the stomach in a case of cicatrisation of the pylorus invariably contains an excess of free hydrochloric acid, while in cancer the mineral acid is absent and lactic acid abundant. Even in the absence of a definite history, a dilated and hypertrophied stomach, which contains an excess of free hydrochloric acid, is extremely unlikely to be the seat of a malignant growth.

CLINICAL RECORDS.

CASE OF MAL-DEVELOPMENT OF THE FEMALE GENERATIVE ORGANS.

By A. Veitch, M.B.

A. S., æt. 23, a strong, healthy girl, complained of pains in the back and loins, and absence of the menstrual flow. She had lately received an offer of marriage, but, never having menstruated, was anxious, before accepting, to have a fuller knowledge of her condition. She confessed to occasional acts of masturbation, and also to having erotic sensations when with her lover.

The pains complained of recurred at intervals of about a month, and generally lasted several days. Occasionally their severity was such as to prevent the patient following her employment. They were limited to the right lumbar and right iliac regions, but did not affect the thigh.

The patient was examined under chloroform. Mammæ were absent, the nipples and areolæ being developed no more than is usual in children under 8 years of age. There was a slight covering of hair over the mons veneris, similar to that in girls approaching puberty. The mons was ill-developed. The labia majora were small, and did not hide the rudimentary labia minora. The clitoris was well developed, and had a distinct præputium. The meatus urinarius was in the usual position, and a well-marked vascular caruncle projected from it. The hymen was small, and presented a sharp edge to the examining finger. The vaginal orifice was triangular in shape, with the base directed towards the vestibule. It readily admitted one finger. The vagina was of ordinary depth, and fairly capacious. Its mucous membrane was free from folds. In the upper part of the anterior vaginal wall there was a body the size of a pea, which represented the uterus. It was in fact a rudimentary cervix. A central depression running laterally divided it into two lips, anterior and posterior. The papilla did not project on the peritoneal surface, but was quite evidently lost in the vaginal wall. Further exploration of the pelvis, bimanually, through vagina and rectum, failed to reveal traces of ovaries and tubes.

That ovaries existed was suggested by the regularly recurring pain and the keen sexual appetite.

REVIEWS OF BRITISH AND FOREIGN LITERATURE.

The Origin of Disease, especially of Disease resulting from Intrinsic as opposed to Extrinsic Causes. By ARTHUR V. MEIGS, M.D. London and Philadelphia: J. B. Lippincott Co. 1897.

THIS volume contains an account of the pathological changes in the various organs found in association with the processes of chronic disease, and a consideration of the deductions to be drawn by the clinician as to the diagnosis, prognosis, and treatment of such conditions. Most of these changes are of the nature of fibroid induration, with accompanying degenerations, and thus the main subject is a study of fibrosis in its pathological and clinical aspects, though other processes are also referred to. Throughout the work the various points taken up are abundantly illustrated by cases from the author's own experience.

After introducing the subject, the author devotes a chapter to what he calls the "disease of age"—a condition which practically corresponds with fibrosis of organs and blood vessels, and which he looks upon as the normal indication of physiological decay. Similar changes may, however, occur in young subjects when exposed to unsuitable conditions, etc. This is spoken of as the occurrence of "the disease of age in youth." The term Bright's disease is also used as synonymous with the "disease of age," and it is stated that the change in the kidneys is but part of a general morbid process. This leading idea is amplified in various directions. For example, chronic rheumatism is described as a fibrosis, and therefore to be placed in the above category; but as there is no sharp line of demarcation between acute rheumatism and the chronic rheumatic affections, the former is probably to be considered as a degeneration, and but one of the manifestations of the "disease of age." There is much reasoning of this order in the book.

The chapter following, headed "The Origin of Disease," is occupied with a somewhat speculative discussion and a classification of pathological processes, resulting in the recognition of four chief classes—two due to "intrinsic," and two to "extrinsic," causes. The first of these is represented by malignant growths, which are regarded as due to purely intrinsic causes, arising from derangement of the working of the organism. Of the second, the type is consumption, which differs from cancer "in that external conditions have a larger influence in producing it, but they are alike in that both arise without the introduction into the organism of any foreign substance as their primary cause." "So far as concerns human beings, there is no existing evidence, either clinical or experimental, which can, when judicially examined, be considered to show conclusively that consumption is infectious." From this the author's opinion regarding the tubercle bacillus may be inferred. The third type is syphilis, which stands by itself. It is of purely extrinsic origin, being caused by a specific poison introduced from without, but it resembles cancer and consumption, in that its more remote effect is a tendency to produce morbid fibrous tissue. To the fourth type, also of extrinsic origin, belong the contagious maladies, the infective fevers, etc. The origin of diseases of this class is "entirely hidden from us"; the search for their causes "remains unrewarded." The reader may be inclined to ask, Is there anything known of the "origin of disease"?

The chapters on the individual organs represent a vast amount of painstaking investigation, and the histological description is very fully illustrated by etched plates, which appear to be very faithful representations of the original specimens. Each plate has a full description appended to it. The fibroid and other degenerative changes in the heart and blood vessels are naturally treated at considerable length, and some of the conclusions are at marked variance with the commonly held opinions. The statement that "compensatory hypertrophy of the heart, as it is ordinarily described and understood, has no real existence," may come as a shock to many. Or, again, "there is no evidence that the valvulitis and the leaking which so often result from endocarditis precede the disease of the muscular tissue, which is their invariable accompaniment." Dr. Meigs also questions very much the existence of reliable evidence that in chronic Bright's disease, or arterial fibrosis, there is any increase of the arterial pressure, as also the possibility in most cases of distinguishing such a condition from a thickened artery wall. For the grounds of these beliefs the reader must be referred to the original work. The pathological histology of the lungs, lower spleen, etc., are treated in separate chapters. Much is well done, though on various points we disagree with the author.

The latter portion of the book, devoted to the diagnosis, prognosis, and treatment of chronic disease (fibrosis, with any superadded inflammatory conditions), is of an interesting character, and contains much sound opinion. Regarding the causation of chronic disease little is said; it may occur from the "passage of time," and in earlier years from dissipation, etc., or from an inherited disposition to premature decay. The volume is well written, and contains much that will prove instructive and suggestive to the physician. But, in seeking to arrive at generalisations, the author has come to treat as of similar nature conditions which are different both as to their causation and course.

Robert Muir.

A System of Medicine by many Writers. Edited by Thomas Clifford Allbutt, M.A., M.D., LL.D., F.R.C.P., F.R.S., F.L.S., F.S.A. Vol. iv. London: Macmillan & Co. Ltd. 1897.

The original estimate of the amount of matter which would require to be included within the limits of this "System of Medicine," and of the possibility of its inclusion in five volumes, has already proved to have been too meagre. In the preface to the fourth volume, the editor confesses that at least six will be required, a confession which will scarcely surprise any who have had the opportunity of reading and profiting by the articles forming the earlier parts. It would not be a matter for regret should the work extend still further, and include a seventh volume; on the contrary, if clearness and completeness were to be sacrificed in the remaining portions to the inexorable demands of space, the profession at large would be the poorer. Summaries of any subject, even if they be fairly full summaries, are out of place in such a "System."

In the present volume the diseases of the liver, kidneys, lymphatic and ductless glands, of the respiratory organs, the nose, pharynx, and larynx, are discussed.

Dr. William Hunter is responsible for the first seven sections, referring to anatomy and functions of the liver, to congestion of the organ, jaundice, toxæmic jaundice, Weil's disease, and acute yellow atrophy.

After a short description of the anatomy of the liver, Dr. Hunter goes on to indicate, in a terse but masterly way, the latter-day views of the hepatic functions. He warily skirts the extreme edge of the glycogenic controversy, no actual approach towards a definite theory being risked. The doubtful existence of any true cholagogue drug is regarded as a matter requiring further investigation.

A point which might have been more distinctly referred to, is the action of the liver upon the products of intestinal putrefaction, and the connection between the amount of ethereal sulphates in the urine in such cases, and the changes brought about in the liver upon those products, insufficient action on its part, or excess of the products leading to toxic symptoms. The writer's well-known views as to the site of hæmolysis are recapitulated.

Coming to Dr. Hunter's description of hepatic diseases, the separation of congestion into passive and active is adopted—"The degree of congestion (active) of the liver in health is a question mainly of gastro-intestinal chemistry"; while in congestion of the organ the causes may be divided into gastro-intestinal and toxic — an admirable and lucid, though, for a work like this, far too theoretical, chapter on jaundice and its causes. The general practitioner, for whom (*vide* preface) the series is intended, will derive little consolation from this section. He will find numerous facts about polycholia, hæmo-hepatogenous jaundice, jaundice from diminished metabolic processes, and the like, but he will search in vain for any guidance as to treatment. It is to be feared that scientific facts will hardly profit him if he cannot treat the subdivisions of the diseases he has been able to diagnose from them.

Dr. Hale White follows with a section on perihepatitis, Dr. A. Davidson on suppurative, and Dr. Lafleur on amœbic abscess of the liver. The account given by Dr. Hawkins of cirrhosis of the liver can hardly be regarded as sufficiently complete. Mention might have been made of the form of hypertrophic cirrhosis which has been described as occurring in children, while the omission, though intentional, of the rarer cirrhotic conditions is unfortunate.

Dr. John Thomson's descriptions of "congenital obliterations of the bile ducts" and "icterus neonatorum" leave nothing further to be a very clear and comprehensive idea of the great strides clinical diagnosis and teaching have made since he was a student.

The writers have wisely selected the different chapters with which they have been most conversant as teachers, and although both have revised the whole, the sections bear the characteristic style of the respective authors. The method of case-taking is full, and is manifestly the outcome of much thought and care, but it suggests a previous knowledge of disease, and therefore in its extended form will appeal more to the student after he has become acquainted with the later chapters, and with a considerable knowledge of medicine besides. It seems also a pity to dissociate the eye, larynx, and throat from their respective systems, although such an arrangement is not uncommonly followed.

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Similar objections might be raised to the position assigned to the various valves of the heart, but there are many different opinions on such disputed points.

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Robert A. Fleming.

RECENT ADVANCES IN MEDICAL SCIENCE.

MEDICINE.

UNDER THE CHARGE OF

A. LOCKHART GILLESPIE, M.D., F.R.C.P.Ed.,
MEDICAL REGISTRAR, EDINBURGH ROYAL INFIRMARY.

GASTRIC HYPERACIDITY.

THE term hyperacidity includes nowadays two well-defined classes—hyperchlorhydria, or excess of hydrochloric acid in the stomach contents, and hyperacidity due to organic acids. The first is produced directly by faulty processes occurring in the body, and arising from several different causes. The second is an indirect result of other abnormal processes which lead to a decrease in the amount of antiseptic mineral acid poured out from the gastric glands. Of late years this condition has attracted much attention, and has been the subject of repeated investigation. Hyperacidity belonging to the second class has been shown to be very amenable to treatment, though apt to reappear; the first, on the other hand, presents a much more difficult problem, for, as a rule, the origin of the excess of acid secreted is rarely to be connected with any purely local condition.

In the *Therap. Monatschr.* for September 1897, Jaworski reports good results in the treatment of both of these forms of hyperacidity, by effervescing alkaline waters containing bicarbonate and salicylate of sodium and borax, and charged with carbonic acid.

Rémond (*Languedoc med.-chir. journ.*, 10th July 1897) describes the general conditions presented by sufferers from hyperchlorhydria as consisting of alternative constipation and sudden diarrhœa. The cause of the latter, he maintains, is due to a momentary relaxation of the pylorus, usually kept spasmodically closed by reflex irritation from the acid stomach contents. This sudden opening of the lower orifice of the stomach permits of a sudden inrush of the contents into the bowel, in contrast to the normal fractional method of expulsion. The patient has a constant pain in the region of the stomach, which now and then becomes aggravated, and may even cause most severe paroxysms of acute pain. These paroxysms are often started by the ingestion of a greater quantity of vegetable food than usual. Alkalies and milk only soothe the pain for a short time. As this form of hyperacidity is most frequently due to nervous causes, it is often accompanied by some degree of dilatation of the stomach, in addition to the effect caused by retention of the contents, owing to the pyloric spasm. As the contents which accumulate in the organ contain a large proportion of hydrochloric acid, little or no fermentation can take place; but should the food contain much carbohydrate material, which is mostly unaffected by peptic digestion, the residue becomes more irritated in character; vomiting in time is brought on, and gives relief for the moment. Lavage is also of temporary benefit, as is the administration of foods containing easily digested proteids.

Liebmann (*Boston Med. and S. Journ.*, 4th Nov. 1897) divides cases of hyperacidity into the following two classes, based upon the results of treatment:—

Hyperacidity.

NEUROTIC.	CATARRHAL.
LAVAGE, of little or no service.	Long-continued, beneficial.
PEPSIN, of no service.	Of little value.
BISMUTH, allays burning pain.	Of no service.
NERVINES (assafœtida, bromides) massage, electricity, hydrotherapeutics, beneficial.	Negative result.
SYMPTOMATIC alkaline treatment, beneficial.	Beneficial.
NITROGENOUS diet (meat, eggs), well borne.	Gives distress, meat more so than eggs.
NEUROTIC form often part of other neuroses (hysteria, neurasthenia).	Catarrhal form not dependent upon neuroses.
APPETITE not decreased, but mostly increased.	Never increased, but often disturbed and lacking.
VOMITING absent.	Frequent.
TONGUE clear, moist, pale-red.	Coated with a thin fur, white and dry.
MUCUS in wash-water, absent.	Present, mostly in large amounts.
SUBJECTIVE symptoms present, as burning sensation, sensation of cold (hyperæsthesia); a gnawing, empty sensation (bulimia).	Not much of a pain or burning sensation, but a feeling of fulness, pressure in epigastrium.
ERUCTATIONS of odourless gases.	Of bad-smelling gases.

Hemmeter (*Journ. Am. Med. Ass.*) takes up quite a different position. He recognises the temporary benefit which is derived from the ingestion of meat, milk, and eggs in cases of hyperchlorhydria, but regards it as a stimulant to the further secretion of the acid. He recommends, therefore, a carbohydrate diet, should antecedent treatment with proteids fail to give permanent relief. He supposes that an amylaceous diet acts more vigorously upon the exciting cause of the excessive secretion of acid, because it is not a stimulant to the glands, and does not add to the irritation already present. In addition, it is to a certain extent antiseptic, at least in the bowel, owing to the increase in the formation of lactic acid. The local benefit derived from this carbohydrate diet may be assisted in no slight degree by its action upon the gouty diatheses which are not infrequently present in patients suffering from this disease. Hamilton (*Canad. Pract.*, Toronto, July 1897) treats of the same subject on very similar lines.

When, however, hyperchlorhydria is accompanied by hypersecretion of gastric juice, the conditions are altered. This combination of the two abnormal conditions is known as Reichmann's disease. In an abstract published in *Policlin.*, Roma, for July, of a paper by Roux (*Gaz. d. hôp.*, Paris, 29th May 1897), the following conclusions are given:—(1) It is better to call this disease the "syndrome" of Reichmann, than Reichmann's disease. (2) It is an exaggeration to look upon this "syndrome" as being in all cases a clinical sign of motor insufficiency of the stomach, due almost entirely to an incomplete organic stenosis of the pylorus, or just below the pylorus. (3) In most cases the secretory activity of the gastric mucous membrane is increased; even before hypersecretion occurs, excess of hydrochloric acid can be detected. (4) A positive diagnosis of the "syndrome" can only be made when the stomach contents contain a large excess of hydrochloric acid after a test meal taken on an empty stomach, in addition to the presence of active gastric juice in the stomach before breakfast. (5) Intermediate forms between simple hyperacidity and hyperacidity combined with hypersecretion can be demonstrated. (6) There is no doubt, however, that stasis of the stomach contents plays an important rôle in the development of the symptoms, but that it is not alone sufficient to cause the "syndrome," although removal of the contents through the stomach tube causes great temporary relief.

NEW CLINICAL METHODS.

KELLING (*München. med. Wchnschr.*, 24th August 1897) describes an instrument which he terms an œsophagoscope. This instrument consists of a tube with a squarely cut end. The inventor claims that the instrument is easily managed, that its use is not dangerous, and that through it much can be learned as to the state of the œsophagus and stomach. Kuttner (*Berl. klin. Wchnschr.*, October 1897) describes a similar gastroscope, the tube of which can be lengthened or shortened by rotation at the outer end. A full description of either of these two instruments would take too long, but neither of them appear to be quite free from danger, nor as yet have they helped to any considerable extent in either diagnosis or treatment of gastric disorders. Kuttner, indeed, is of opinion that the aid given by the use of such instruments is more than counterbalanced by the discomfort and injury done to the patient.

Kuhn (*Deutsche med. Wchnschr.*, Leipzig, 1897, Bd. xxxvii.) describes a metal spiral sound, with which he can not only examine the mucous membrane of the stomach, and estimate the position of its walls, but also determine the condition and calibre of the pyloric orifice. Elsewhere (*Centralbl. f. innere Med.*, Leipzig, 1897, Bd. xviii.) Kuhn has gone further in a few cases, and introduced a sound through the pylorus, being thus able to estimate whether that opening is of normal size or constricted.

Schneider (*Virchow's Archiv*, 1897, Bd. cxlviii. S. 1 and 2) found out of 517 patients only seventy-seven (14·8 per cent.) with a normal secretion of hydrochloric acid. The normal acidity in the contents was most frequent in cases of gastric ulcer. Contrary to the usual opinions, he found little disturbance of the secretion in cases of cancer. Only twenty-eight (5·4 per cent.) of the 517 patients suffered from hyperacidity, 18·4 per cent. among those with gastric ulcer, 50 per cent. among those with neurasthenia. In as many as 412, little or no free hydrochloric acid could be detected four hours after Riegel's test meal, or one hour after Ewald's test breakfast. Here the author's results corresponded with the results of other observers which have been lately published. That is to say, that in gastric ulcer, gastric neurasthenia, and gastralgia, diminished acidity of the stomach contents is infrequent, while it is most common in cases of cancer.

SURGERY.

UNDER THE CHARGE OF

ALEXIS THOMSON, M.D., F.R.C.S.Ed.,

LECTURER ON SURGERY, SCHOOL OF MEDICINE, EDINBURGH.

Regional Anæsthesia with Cocaine.

Dr. Otto Manz, working as assistant in Prof. Kraske's clinique at Freiburg, has extended the sphere in which cocaine may be used as a local anæsthetic. The procedure employed in a case of caries of the metatarsus may be cited in illustration of what he has been able to accomplish. An Esmarch's constrictor was applied immediately above the malleoli; a solution of cocaine (1 per cent.) was then injected in the position of the different nerve trunks, a number of different punctures being made with the needle. After an interval of three-quarters of an hour, the operation took place; this consisted in the removal of the great toe, its metatarsal bone, and of the cuneiforms, in addition to scraping with the sharp spoon and stitching of the skin. During the hour employed in these procedures, the patient was quite unaware of their progress. It is essential, in all cases in which it is desired to completely anæsthetise the hand or foot, that the rubber tourniquet be very firmly applied, and that a sufficient interval (not less than twenty minutes) be allowed to elapse between the injection of the cocaine and the operation. The author promises in a future paper to discuss the question, to what extent the anæsthesia thus induced is the result of the drug injected, or of the elastic compression of the nerve trunks.—*Centralbl. f. Chir.*, Leipzig, 19th Feb. 1898, No. 7.

Sterilisation of the Skin in the Area of Operation.

Landerer and Krâmer of Stuttgart record their experience of the capacities of formalin as a germicide to be applied to the skin of the patient. After the usual cleansing with soap and water, and shaving with the razor, a compress soaked in 1 per cent. solution of formalin is applied, and covered with a sheet of mackintosh. Immediately before the operation, the washing and shaving are repeated; the skin is then rubbed with ether, and finally with corrosive sublimate. Careful bacteriological examination showed the skin to be sterile in 80–90 per cent. of the cases. The wounds in sixty cases healed by first intention, except in three cases of large hernia, in which portions of the thick sac were thrown off without any rise of temperature. The special merit of formalin as a disinfectant for the skin, lies in its capacity for acting in the form of vapour as well as of solution; it is thus able to penetrate the deeper layers of the skin, and to act upon the organisms therein embedded. The usual antiseptics, when applied to the skin, are only able to account for the bacteria on the free surface.—*Centralbl. f. Chir.*, Leipzig, 26th Feb. 1898, No. 8.

INFLATED RUBBER CYLINDERS FOR CIRCULAR SUTURE OF THE INTESTINE.

PROFESSOR HALSTED of Baltimore contributes an article to the second number of the *Philadelphia Medical Journal*, in which, after a very lucid statement of the points to be observed in the union by suture of two cut ends of bowel, he describes and illustrates a method in which the suture is made easier and more accurate by employing a rubber cylinder, which is introduced into the interior of the bowel and then inflated like the tyre of a bicycle. The ends of the bowel which it is intended to unite are first brought into contact by means of three fixation sutures, which have been inserted before the intervening diseased segment was resected. The collapsed rubber cylinder is then pushed into the lumen of the bowel, through the opening between any two of the fixation sutures. The bag or cylinder is then inflated with air by the syringe or pump. The cut edges of bowel are united to each other by a series of interrupted mattress or permanent stitches, which penetrate the serous, muscular, and submucous coats, and which are all placed before any one of them is tied. The most important of the series is that at the mesenteric border, and it is the first to be drawn home and tied. When all the sutures have been placed, two of them are drawn aside, and the collapsed rubber cylinder is withdrawn. The tying of the sutures is then completed.

The advantages of the method are summed up as follows:—

1. The vermicular action of the bowel is arrested over the bag, and the stitches can consequently be placed at regular and proper intervals.
2. The distended bag unrolls and spreads out to a fine edge the everted raw edge of the intestine, and enables the operator to place the stitches with great precision at the desired distance from this edge.
3. If a distended intestine is to be sutured to collapsed intestine, or intestine of larger to intestine of smaller lumen, the smaller may easily be expanded to fit the larger piece. This is, perhaps, the most important action of the cylinder.
4. The cylinder takes the place of at least two assistants.
5. It prevents the escape of intestinal contents, and hence dispenses with clamps or fingers.—*Phila. Med. Journ.*, 8th January 1898, No. 2.

THE TREATMENT OF PROSTATIC HYPERTROPHY BY OPERATIONS ON THE SEXUAL ORGANS.

THIS is made the subject of a series of articles in the *Ann. d. mal. d. org. génito-urin.*, Paris (January, February, and March 1898), by a very clear and comprehensive idea of the great strides clinical diagnosis and teaching have made since he was a student.

The writers have wisely selected the different chapters with which they have been most conversant as teachers, and although both have revised the whole, the sections bear the characteristic style of the respective authors. The method of case-taking is full, and is manifestly the outcome of much thought and care, but it suggests a previous knowledge of disease, and therefore in its extended form will appeal more to the student after he has become acquainted with the later chapters, and with a considerable knowledge of medicine besides. It seems also a pity to dissociate the eye, larynx, and throat from their respective systems, although such an arrangement is not uncommonly followed.

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UNDER THE CHARGE OF

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Gastric Hyperacidity.

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The paralysis affects most severely the anterior-tibial and peroneal groups of muscles in the lower extremity, and in the arms the posterior interosseous group. The sphincters may be transiently slightly affected. Sensation escapes, as a rule, much more lightly than the motor functions. In five cases the presence of dysphagia or tachycardia suggested implication of the vagus; while in two, loss of voice pointed to a lesion of the spinal accessory. Mental symptoms occurred in six cases, varying in severity from simple emotionalism to acute mania.

In the localised polyneuritis type the disease may affect either the upper or lower limbs. When the arms alone are affected, the ulnar and median nerves are more frequently implicated than any other, instead of the posterior interosseous group when the disease is general. The symptoms of pain, wasting, etc., are similar to those already described. In six out of seven cases in which the lower limbs alone were paralysed, the anterior-crural and sciatic nerves were implicated. In the cases in which a single nerve was alone affected, the ulnar and sciatic were most commonly the seat of disease. When the sciatic was affected, only three out of thirty-six cases gave a history of difficult delivery, which tends to exclude the possibility of traumatism being the actual cause of the lesion.

In considering the etiology of the neuritis, the author cites some interesting features,—for example, the frequent association of hyperemesis of pregnancy and the nerve lesions. This, however, he does not consider to be the cause, but merely a coincident symptom, the result of auto-intoxication. This condition is particularly liable to be present during the pregnant state, as an increased tissue metabolism is necessary at this time, proved by the increased toxicity of the urine. Should, therefore, there be any defect in the elimination of the toxins naturally present, toxic effects will be manifested; in certain cases giving rise to excessive vomiting, in others to eclamptic convulsions, and probably in others to neuritis. According to the semi-metaphysical pathology of nerve cells which still prevails, it is possible the minor psychoses of pregnancy may spring into existence, on the basis of an abnormal irritability induced by minor toxic influences. Should these obtain during gestation, it will be apparent how much more liable the organism will be to be poisoned in the puerperal state, when there is suddenly thrown into its circulation the products of retrograde metabolism, from rapid involution of the uterus and other organs.

The prognosis, as in other forms of polyneuritis, is not directly dangerous to life; only one death among the thirty-six cases occurred as a result of the paralysis. Recovery in the large majority of cases is complete, though not infrequently two or more years elapsed before the disappearance of the last symptom. In the few exceptions, where localised paralysis remained, it was probably due to a shortening of the tendons (pseudo-paralysis).

In the treatment, stress is laid upon the recognition of toxæmia, as manifested by excessive vomiting, and an energetic attempt being made to supplement the deficiency in excretion by drugs acting on the kidney and skin. If paralytic symptoms endanger life, induction of premature labour is to be considered. Symptomatic treatment must be conducted in accordance with general principles; while, after the subsidence of the irritative stage, electricity and massage are to be employed. Care is to be taken from the first to avoid contractures; these are due partly to the position of extreme flexion adopted spontaneously to relieve tension on painful structures, and partly by the dropping of the feet, from the paralysis of the anterior tibial and peroneal groups of muscles.—*St. Thomas's Hosp. Rep.*, London, vol. xxv.

TYMPANITES UTERI.

LINDENTHAL discussed, before the Vienna Royal Society of Physicians, the origin of tympanites uteri, as derived from a series of four cases he had investigated. From these he demonstrated the condition to be due to the influence of organisms. Though a variety of germs were found in the different cases, in all he found an anærobic bacillus, which was capable of producing gas in large quantities in a short time. The bacillus seemed to correspond closely with the bacillus of malignant œdema. He also stated that, from the fact of the tympanites being present, although the fœtus still survived, the former supposition of its origin from fœtal decomposition was untenable.

RECURRENT INVERSION OF UTERUS.

AN example of this extremely rare if not unique condition is described by Swan.

A patient, æt. 49, complained that suddenly, while lifting a heavy weight, she felt something "give way in her inside," since which time she had found it impossible to empty her bladder. For years previously she had noted a large round swelling at the vulva, and had suffered from profuse leucorrhœa, irregular and profuse menstruation, and a feeling of weight and discomfort in the pelvis. Her last child was born sixteen years before, and she had been a widow for fifteen years.

On examination, a rounded swelling, the size of a small cocoanut, was found projecting from the vulva; it appeared spongy and œdematous, and presented two lateral openings, the Fallopian tube orifices. Reduction of the inverted uterus was easily accomplished, after which she immediately involuntarily passed about a quart of urine. After two weeks' rest in bed the patient was allowed to get up, but within three hours the inversion returned, associated with the same symptoms as before. The uterus was again replaced easily, and kept in proper position by a pyriform-shaped intra-uterine stem-pessary. This she wore for a year without discomfort, when she removed it herself and could not reintroduce it. Feeling comfortable without it, she had gone without it for three years, when accidentally she was seen by the author. On examination, he now found the uterus small and atrophied, and in normal position. After an exhaustive examination of the literature of inversion, involving the inspection of 650 separate articles on the subject, no similar case could be found. The latest statistics appear to show that simple inversion occurs about once in 190,000 cases of labour, while of 400 cases collected by Crasse, 350 occurred in the puerperal uterus; and of the remaining 50, 40 were due to polypi.—*Albany Med. Annals*, Jan. 1898.

SYMPHYSEOTOMY.

THIS operation has been performed thirty-one times at the Frauen Klinik of Leipzig University. Of these cases Zweifel gives an analysis, and arrives at some deductions of practical importance and interest.

All the mothers recovered, and are in no way injured by the operation, being able to walk and work as usual. But two children died. The author strongly insists on the operation being employed only where the true conjugate is more than 65 mm., and considers that most of the cases stated in which the mothers have subsequently been unable to walk without difficulty, have been due to the operation having been performed where too great contraction was present, thus necessitating over-separation of the symphysis, with consequent damage to the sacro-iliac joints.

In comparison with Cæsarean section, the operation of symphyseotomy is safer, and is not associated with a more delayed convalescence; some of Zweifel's patients were up on the seventeenth day, and the majority before the end of the fourth week. It is strongly recommended that, after the separation of the symphysis, spontaneous expulsion of the child is to be favoured where possible, as by this means laceration of the vagina is minimised. The severe hæmorrhage which occasionally follows the passage of the child is most readily arrested by approximating the pubes, packing gauze in front and behind the bones, and applying counter-pressure through the vagina. The pubic bones are united by two silver and two absorbable sutures; the former are removed in about ten days. The main danger from the operation is septic infection of the wound. To as far as possible avoid this, the wound should be packed with sterilised iodoform gauze, kept in position by a T-bandage. The gauze is to be removed gradually after eight to ten days, and the wound allowed to heal by granulation.—*Ann. de gynéc.*, Paris, October 1897.

THERAPEUTICS.

UNDER THE CHARGE OF

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DRY HOT AIR IN TREATMENT OF JOINT AFFECTIONS.

IN the course of an article on the treatment of gout (*Journ. Amer. Med. Assoc.*, July 31, 1897), H. C. Wood records his experience of the action of dry hot air in inflammation of joints and connective tissues. He used the Tallerman-Sheffield apparatus, and claims to have given it a very extensive trial. He states that it is absurd to suppose that dry hot air will cure the gouty diathesis, and he found that it is of very little value in lessening chronic gouty inflammations of joints. The patients themselves were dissatisfied with the treatment, and after a fair trial usually refused to continue. Nor was it efficacious in rheumatoid arthritis, nor in chronic joint rheumatism. On the other hand, the results were often very rapid and gratifying in cases of deposits in the tendons and outside the joints, and especially in traumatic synovitis.

In subacute rheumatism it also is of value through the sweating, and apparently by a local influence on the joint.

Potassium Permanganate as an Antidote in Morphine and Opium Poisoning.

A few years ago, Dr. W. Moor of New York demonstrated that potassium permanganate is an efficient antidote to morphine, if it be given before sufficient time has elapsed for the latter to be absorbed from the stomach. The morphine is apparently oxidised to an inert compound, 1 gr. of potassium permanganate in solution being generally given to destroy the activity of an equal quantity of morphine. The efficacy of this plan of treatment has been shown over and over again.

Not content with this, Moor and others have advocated the hypodermic injection of potassium permanganate, and cases have been published in which recovery from opium poisoning has been attributed to this method of treatment. Thornton and Holder (*Therap. Gaz.*, Detroit, Jan. 1898) regard these claims as extravagant, and point out that there are but three possible ways in which, given hypodermically, it may overcome the poisonous effects of opium—(1) By coming in contact with the alkaloids in the blood and oxidising them; (2) by acting as a physiological antagonist; and (3) by giving rise to such severe pain locally, that the patient is thereby roused. They consider that none of these is a probable mode of action. To settle the matter definitely, they instituted a series of experiments on dogs. They first fixed the dose of morphine sufficient to kill a dog in two or three hours, and then five dogs, after receiving a lethal dose, had administered to them subcutaneously full doses of potassium permanganate. All these dogs died as promptly as if no permanganate had been given. Nor was it found that the latter was capable of modifying the symptoms produced by non-lethal doses of morphine. Subcutaneous injection of permanganate of potassium gives rise to very severe pain locally, and should therefore be avoided unless one is certain of its efficacy, but it does not produce any symptoms of systemic poisoning.

The Constituent of the Suprarenal Capsule which raises Blood Pressure.

In the *Johns Hopkins Hosp. Bull.*, Baltimore, July 1897, Abel and Crawford contribute an article on this subject. Schäfer and Oliver and other physiologists have shown that a very small quantity of an aqueous extract of the medullary substance of the suprarenal gland raises the blood pressure to a great height above the normal. It also revives a heart which has been severely poisoned with, for instance, chloral hydrate. Bates (*New York Med. Journ.*, 1896) found that its application to the eye caused marked constriction of blood vessels, and pallor. He uses it in prolonged operations to prevent hæmorrhage and to indefinitely prolong cocaine anæsthesia. These watery extracts are mixtures of several unknown substances. After reviewing previous attempts to obtain the pure active substance which the authors think may prove to be of great therapeutical value, they describe their method of obtaining it as a benzoyl compound. Split off from the benzoyl, it appears to be an alkaloid closely allied to the pyridine bases or to the pyrrol compounds (these bodies are known to raise the blood pressure very markedly). It is therefore most probably an alkaloid of comparatively simple chemical constitution. Its sulphate is crystalline, and is physiologically very active. Pyro-catechin cannot be split off from it, and as they were unable to positively detect pyro-catechin in the gland, they consider Mühlmann's statement as to its being the constituent which influences blood pressure as incorrect. Tracings of its effect on blood pressure are given.

Experimental Research on Secretion of Bile in Man.

The subject of observation was a woman in whom a biliary fistula had resulted after operation. The observations extended over ninety-seven days, and were made in the Boston Hospital by Pfaff and Balch (*Journ. Exper. Med.*, Baltimore, 1897). The bile was led through an elastic tube, and was collected in a glass bottle.

Preliminary observations showed that—(1) The amount secreted per hour varied from 8 to 42 c.c. (about ⅓ to 1½ oz. roughly), irrespective of the time of day or of meals. (2) But in general there was a rise after meals during the day, and a decrease during the night, the minimum being generally reached before breakfast. (3) The specific gravity varied from 1008 to 1010, the solid constituents from 1·6 to 1·7 per cent., the ash from 0·8 to 0·9 per cent. The bile secreted during the night was rather more concentrated. (4) The quantity secreted during twenty-four hours varied from 501 to 525 c.c. (roughly about 18 to 19 oz.), which may be considered as a fairly constant result.

The authors then studied the action of various reputed cholagogues on the secretion.

1. The patient's own bile, after being dried on the water bath, was given in doses corresponding to from 25 to 500 c.c. fresh bile. This was continued for twelve days. The amount of bile on the average was increased to 685 c.c., and the solid residue to 2·04 per cent. On discontinuing the administration, there was a rapid fall in the amount of bile secreted.
2. Salol, 9 grs., four times daily, had no effect.
3. Mercuric chloride, $\frac{1}{40}$ to $\frac{1}{20}$ gr., four times daily, had no effect.
4. Ox bile, dried to powder and given in doses of 28 to 140 grs. daily during a week, caused the secretion to rise on an average to 770 c.c. per day, and the solids to average 2·62 per cent.
5. Calomel, in doses of 1½ to 1⅘ grs. per day, had no effect during six days.
6. A mixture of pure salts of glycocholic and taurocholic acids, in doses of about 4 grs., up to eleven times daily, given during seventeen days, increased the average daily secretion to 787 c.c., and the solid residue to 2·18 per cent.

Special investigations showed that the administration of bile greatly increased the amount of glycocholic and taurocholic acids. The authors recommend that in cases where it is deemed desirable to increase the biliary secretion, purified ox bile be given in doses of 8 to 10 grs. thrice daily. It may be remarked in passing, however, that neither they nor others have clearly laid down the clinical conditions in which an increased secretion of bile is desirable. Another very important point is left undetermined, namely, whether the increase in secretion is a real increase, or is simply due to the excretion of the bile administered.

ORTHOFORM.

THIS is a new local anæsthetic, which is recommended for treating painful ulcers, burns, and open sores of all kinds. Chemically, it is the methyl ether of p-amido-m-oxybenzoic acid, and its preparation is the result of several years' work on the part of its discoverers, Einhorn and Heinz (*München. med. Wchnschr.*, 1897). It is a white crystalline powder without taste or smell, light and bulky, and almost insoluble in water. This comparative insolubility constitutes its practical value, as it dissolves in the secretions slowly, and just sufficiently to exercise a prolonged and gentle local anæsthetic action, which lasts for hours or even days, according to circumstances. The hydrochloride is crystalline and very soluble, and is also anæsthetic in action, but its acid reaction makes it irritating, especially on delicate surfaces, or if given subcutaneously. Owing to the insolubility of orthoform, its anæsthetic action on the tongue or elsewhere takes some minutes to develop. It is best used in fine powder, or as an ointment (10 per cent.). Experiments have shown it to be absolutely non-poisonous, and as much as 50 grms. have been applied to an ulcer in one week without causing any general symptoms. It lessens secretion and is strongly antiseptic, so that it makes an excellent dressing for open wounds of all kinds, and in laryngeal ulcerations.

In painful ulcer and carcinoma of the stomach it has been given with good results, but where there is no ulceration it has not proved effective in gastric pain. For internal use, the dose is 7 to 15 grs. several times daily.

Neumayer (*München. med. Wchnschr.*, 1897) confirms its value in laryngeal ulceration—3 grs. blown on the ulcer lessens pain and irritation sometimes for days at a time. Similar good results were got in ulceration of the stomach. It is of little value apparently where the mucous membrane is intact, and acts best when it comes in contact with exposed nerves directly. This is no doubt due to the fact that it is not easily absorbed. Orthoform is preferable to the hydro-chloride, as the latter often causes irritation.

INSANITY.

UNDER THE CHARGE OF

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THE BACTERIOLOGY OF THE CEREBRO-SPINAL FLUID IN GENERAL PARALYSIS.

FOLLOWING the method devised by Quincke, and described by him in 1891, for the extraction of cerebro-spinal fluid without trephining the vertebræ, which, as Quincke claimed, and has since been completely established by others, is perfectly harmless, Drs. Montesano Giuseppe and Montessori Maria (*Riv. Quin. di Psicol. Psichat. Neuropatol*, Roma, 1 Decembre 1897) have given the results of the bacteriological examination of the cerebro-spinal fluid in eleven cases of general paralysis. The authors were struck by the fact that in all acute maladies of bacteriological origin in the central nervous system, especially in those maladies which implicated the meninges, the cerebro-spinal fluid generally revealed the presence of the micro-organisms which constituted the pathogenic factors in the disease. They accordingly resolved to examine the cerebro-spinal fluid in the living subject of general paralysis.

The patients operated upon were put under chloroform. The cerebro-spinal fluid was withdrawn by means of Tursini and Koch syringes, of the capacity of from 30 to 40 c.c., with fine needles 8 to 10 cm. long. The instruments used, as well as the skin of the patients, were most carefully and perfectly sterilised, and the extraction of the fluid was performed with the assistance of Dr. Pasca, surgeon to the Hospital of Rome. The quantity of fluid generally extracted was from 30 to 40 c.c.

1. The direct examination of the fluid, or of the sediment produced after its subjection to centrifugal action, gave no results, so far as the detection of micro-organisms was concerned.

2. The direct inoculation of the fluid into animals gave negative results in eight experiments. In two guinea-pigs a characteristic indisposition was developed, which resulted in death on the fourth day. In a third guinea-pig, marked tetanic phenomena manifested themselves on the day following the inoculation, which increased in severity, and ended fatally on the fifth day. Cultures made from the first two animals revealed the presence of a special bacillus, afterwards to be described. In cultures made from the third animal, on the other hand, only streptococci resulted, which did not produce tetanic affection in other animals.

3. The ingrafting of this fluid on artificial media gave positive results in eight instances. In three instances only was there failure.

4. The simple enclosure of the fluid in sterilised tubes, some at an artificial temperature and others at atmospheric temperature, only resulted in three cases in the development of small colonies of microbes.

With regard to the form of micro-organisms, no special pathogenic form was isolated. On the contrary, streptococci, staphylococci, sarcinæ, the bacillus of tetanus, and another bacillus, with characteristic features, which the authors, on account of its special reaction, have named *B. viscosus*, were found.

The following is a list of the cases, and of the micro-organisms which were found in each:—

CASE 1.—Tabetic general paralysis; long course; much demented. *Streptococcus citreus* and *Sarcina rosa.*

CASE 2.—Recent commencement; great muscular weakness; great mental implication; automatism. *Staphylococcus aureus.*

CASE 3.—Recent commencement; maniacal excitement; great emaciation. *Streptococcus pyogenes.*

Case 4.—Recent commencement; delusions of grandeur; mental enfeeblement. *Bacillus viscosus* and *S. aurantiaca.*

Case 5.—Slow course; dementia. *B. viscosus.*

Case 6.—Recent commencement; mental exaltation; delusions of grandeur. *B. viscosus.*

Case 7.—Recent commencement; mental exaltation; mental weakness. *B. viscosus* and *Streptococcus pyogenes.*

Case 8.—Rapid course; epileptiform attacks from commencement; condition of mental subconsciousness. *Streptococcus pyogenes* and bacillus of tetanus.

Case 9.—Long course; dementia; result negative.

Case 10.—Very long course; dementia; result negative.

Case 11.—Duration about one year; apathy; colourless delusions of grandeur; result negative.

The following is the order of frequency in which the micro-organisms were found:—(1) *B. viscosus,* four times; (2) streptococci, three times; (3) staphylococci and sarcinæ, four times; (4) bacillus of tetanus, once.

With regard to the virulence of these various micro-organisms, the authors found that the streptococci and staphylococci were either completely innocuous, or produced only a slight formation of pus at the seat of injection. On the other hand, they found that the bacillus of tetanus and the *B. viscosus* were intensely toxic. It has been observed above that the inoculation of a guinea-pig with the cerebro-spinal fluid in which the bacillus of tetanus was found, caused the death of the animal in five days with tetanic convulsions, and that the bacillus could not be cultivated from the blood or tissues of the animal. On the other hand, cultures made directly from the same patient upon artificial nutritive media always resulted in the development of the bacillus of tetanus. Its pathogenic and morphological characters were fully tested, by injection into animals, by microscopic examination, and by observations of its peculiar reaction and growth in certain media. In order to remove any doubt as to the presence of this bacillus being an accident in laboratory technique, the first puncture made on the same patient on the 18th of March 1897 was followed by another on the 16th of April, and in the second sample of fluid the same streptococcus and tetanus bacillus were found. Not only so, but the result was again verified by examination of the fluid at the post-mortem examination on the 10th of June following.

The peculiar bacillus which the authors describe as *viscosus* had the following characteristics:—In form it was small, being from 1 to 1½ microm. long, and 0·4 microm. broad, with rounded extremity, generally isolated, but sometimes in long filaments. They were easily stained with any of the common aniline dyes, but they were not decolorised by Gram's method. They grew rapidly in broth, causing turbidity, with the formation of a greyish paste on its surface adherent to the glass; the liquid quickly became viscous and thready. There was no special odour. In gelatin, the culture in tubes grew downwards for the most part, with liquefying of the gelatin. On plates they formed round colonies, with regular contours of a whitish-grey colour.

In agar they formed a greyish transparent paste, which, when lifted up with platinum wire, showed viscous and thready. On potatoes, a dense whitish-grey paste, slightly viscous, was formed. In milk the bacillus developed readily, the fluid became acid, viscous, but not coagulated. The bacillus developed freely in the absence of oxygen. It was found to be extremely virulent in its action on guinea-pigs and rabbits, and the virulence increased as it passed through the bodies of successive animals. The culture in broth obtained from the first graft from the cerebro-spinal fluid, and injected subcutaneously into a guinea-pig, produced extensive local infiltration with general infection, and death on the fourth day. The same effect was seen in rabbits, namely, general enfeeblement and depression, but in them recovery took place between seven and eight days after. In those animals which succumbed, there was great inflammatory infiltration at the seat of injection, enlargement of the spleen, the liver, and the kidneys. With successive passages from animal to animal, the virulence was always augmented, until death (without any local manifestation, but with prominent general toxic symptoms) occurred within two or three hours after inoculation. In larger animals, like the dog, the gravity of the affection depended upon the quantity of liquid injected; but the authors observed great physical depression, dyspnœa, and marked nervous symptoms. So much for the pathogenic reaction of this bacillus. With regard to its classification, the authors are positive that it is a new variety. They quote in succession the various bacilli which are viscous in their reaction towards media, all of which they show are not pathogenic. There is only one other which often shows this property, and it is the *Bacterium glyschrogenum* of Malerba, which is pyogenous, and which also produces nephritis in dogs; but the *B. viscosus* does not act upon urine at all. Among the various hypotheses which may be made as to its relationship to existing species, the authors think that the most probable would be to regard it as a variety of the *B. coli communis*. They say: "Given the many properties common to both, and the polymorphism of these micro-organisms in the intestines, as well as in other organs, this hypothesis seems the most likely. The differences between the two, however, are that the one is immobile, the other mobile; that the one is not decolorisable with Gram's method, while the other is; that the distinctive odour of the broth culture of the *B. coli communis* is absent in the case of the *B. viscosus*." On the subject of the relationship of these micro-organisms to the symptoms of general paralysis, the authors are, of course, extremely cautious in their remarks. Allowing for the predisposing etiological influence of syphilis, as well as of overwork, sexual excess, and alcohol in other cases, they are inclined to regard these affections as agents which lower the resisting power of the organism, especially of the central nervous system, and permit of the invasion by micro-organisms. In proof of their position, they point to the researches of Briand, who found an enormous quantity of bacteria in the blood and in the urine of patients suffering from acute delirious mania; also to the researches of Rezzonico, who found emboli of micrococci in the cerebral vessels of similar cases, and to the results of various other observers in the same field. They allude to the discovery by Pelizzi of a virulent streptococcus found in the hæmatoma auris of the insane. In the bacteriology of general paralysis, they record the researches of d'Abundo and Piccinino, who found various microbes in the blood. The latter also found a large bacillus in the cerebral tissues, and suspected that it might be the same as that found by Lustgarten in syphilis. Finally, they quote the work of Grimaldi, who found various streptococci and staphylococci in the blood and urine of general paralytics.

Arguing on these lines, the authors think that it is not likely that any one pathogenic organism is necessarily associated with the symptoms of general paralysis, although they make the reservation that the bacillus of Koch is not invariably found in the cerebro-spinal fluid in tubercular meningitis. Two facts alone they comment upon—First, the relative frequency with which they found a new and hitherto undescribed bacillus of a virulent type in the cerebro-spinal fluid; and, second, the discovery in one particular case of a virulent bacillus of tetanus. The first bacillus was found in nearly 37 per cent. of the cases. With regard to the second bacillus, the authors appear to have no doubt, as they have already carefully pointed out, either as to its identity or to its presence in the cerebro-spinal fluid in one case. They are unable to understand how this bacillus could remain for a period of three months, at least, in the body of an individual gravely debilitated by a chronic disease without producing its own specific reaction; and even granting that the spores of the bacillus, which are known not to be toxic, only existed as such, the difficulty remains, that they were retained by the system for such a long time inactive and undeveloped.

It appears to the authors that the hypothesis of an etiological relation between the bacillus of tetanus and general paralysis, or at least the epileptiform attacks often present in that disease, ought to be taken into consideration; but, as they have other researches in preparation, they decline, in the meantime, to hazard any definite judgment.

They conclude with the two following observations:—First, that there is a form of *B. viscosus* differing from all others described up till now, especially in its pathogenic properties; second, that they have established the presence, in the cerebro-spinal fluid of a general paralytic, of a virulent form of tetanus bacillus, and that that bacillus existed for three months in the body of a patient without manifesting its usual symptoms.

Neurasthenia Essentialis and Neurasthenia Symptomatica.

The condition known as "neurasthenia" has been much discussed and written upon ever since it was first described by Beard, but, as Dercum remarks (*Alienist and Neurol.*, St. Louis, October 1897), "at the present day there still exist, not only in the mind of the general practitioner, but even in the minds of specialists, the most vague and ill-defined notions regarding it." It has been the author's aim to define the limitations of the disease, and in the present article it must be admitted that, if he has not quite succeeded, he has at least given a more concise description than has hitherto been placed before the profession.

He commences by insisting upon the conception of neurasthenia as a "fatigue neurosis." The primary symptoms always present the essential characteristics of weakness and irritability, and are always expressive of fatigue. The secondary symptoms are adventitious outgrowths of the primary fundamental symptoms. For example, in sensory disturbances, we find first a general sense of fatigue. The sensation may be diffused throughout the entire body, but it is generally accentuated in special regions or limbs. It is characteristic of this sense of fatigue that it is in simple and typical cases always relieved or lessened by rest, and always brought on, if absent, or made worse, if present, by exertion. This readiness of fatigue the author regards as the primary and fundamental symptom of neurasthenia. When the fatigue sensations become exaggerated, they become painful, and they are then described as aches by the patient. They may take the form of headache, backache, or aches in limbs, according to the circumstances of the patient or his employment. Not unfrequently, however, there are associated with these sensations others which are secondary. Thus the headache may be accompanied by pressure sensations, or a feeling of lightness and distension, or of giddiness or of distress; the backache by patches of local hyperæsthesia over the spinal region; the limb aches by various paræsthesias and peculiar sensations. In the visual functions, the primary symptoms are often followed by such subjective sensations as seeing everything through a mist or veil, or as seeing objects unnaturally large or at a distance. In the same way the author treats of the auditory, digestive, sexual, and psychical functions. Space only permits us to refer to the last mentioned. Among the prominent primary psychic symptoms of neurasthenia he places a diminution of the capacity for mental work, a want of power of concentrating the attention, which the patient frequently mistakes for loss of memory, a lack of spontaneity of thought, a diminution in the strength of the will, a condition of general indecision, and of mental and emotional irritability. The chief secondary symptom of this state he considers to be an apparently causeless general sense of fear. This general sense of fear may, however, assume specialised forms, which are well known as the various "phobias."

Finally, he describes under the name "neurasthenia terminalis" the organic tissue change which ultimately succeeds prolonged and persistent derangement of function. This final stage of the affection is, however, only briefly alluded to in the paper.

DERMATOLOGY.

UNDER THE CHARGE OF

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ELECTROLYSIS IN HYPERTRICHOSIS.

BROCQ (*Ann. de dermat. et de syph.*, Paris, Aug., Sept., Oct., Nov. 1897) summarises the results of this in 110 cases in which he has operated. The battery which he uses is one of Gaiffe's, or other capable of providing with unipolar electrolysis currents of from 2 to 5 milliampères. He employs a bisulphate of mercury battery. The electrode attached to the positive pole consists of a cylindrical metallic handle, covered with chamois leather, moistened with slightly salt water. The needle-holder connected with the negative pole is linked to the machine by a very fine cord, for the sake of lightness. The needle is of platino-iridium, very thin, and an inch long, bent at an angle of 45° a quarter of an inch from its point. This enables one to gauge more accurately the depth it has been inserted into the skin; it renders the introduction easier, especially in certain regions, as within the nostrils or beneath the chin. Before undertaking the treatment where there are many hairs, the advantages and drawbacks associated with this should be explained; it ought also to be tested on a few hairs, to determine the approximate dose of electricity necessary, the reaction of the particular skin, and the mode of cicatrisation. A commencement should be made with feeble currents, scarcely half a milliampère, increasing rapidly in intensity till that suitable is reached. The patient is seated or reclining, the part to be operated on steadily supported. She should herself control the current. The positive electrode is placed on a thick towel on the patient's knees, resting on silk to ensure insulation. After the needle has been introduced into the follicle, she is directed to grasp the electrode, putting first one and then more fingers on it, finally pressing it with more or less force, in proportion to the intensity required. Hardaway (*Journ. Cutan. and Genito-Urin. Dis.*, N. Y., Sept. 1897) places the positive electrode in a small bowl or tumbler of water, and establishes the connection by the patient inserting one, two, or three fingers, as may be required. This has many advantages. When Brocq considers that the hair is sufficiently acted on, he desires the patient to leave go the electrode; thus there is no shock, the needle is now withdrawn. This method requires some preliminary instruction, but, as in this way pain is lessened, it is soon learned. To determine the approximate depth of the follicle, so that the needle should reach but a trifle beyond the papilla, a hair should be extracted and measured against it. For downy hairs, currents of 1 or 2 milliampères suffice; for those of medium size and depth of implantation, 3 to 4; and even very large hairs demand only about 4 or 5 for their destruction. Different individuals and different regions react variously. Some skins yield very easily; such are in general those which are fine, white, and dry; those, on the contrary, which are thick, greasy, and pigmented, resist. As to the time during which the current should be allowed to pass, if the hairs are large and in situations where slight white marks are unimportant, this may be allowed to go on till a minute brown circle forms round the needle, say about ten or fifteen seconds after froth has appeared on the surface. If on visible parts, where the least scar is undesirable, one should arrest the current as soon as a yellowish-brown halo shows itself. In the instance of downy hairs, a duration of from five to fifteen seconds may be enough. The electrolytic action appears to go on after the needle has been withdrawn, the alkali set free at the negative pole exerts its caustic effect still; it is thus best either to allow some minutes to elapse before exercising traction, or to wait till the end of the séance; if any then resist, the patient should be instructed to remove them herself in the evening. Subsequent to the operation the skin swells, may blister, and become indurated, but if care has been taken, all these soon vanish. If the hairs are large, a minute white spot for a time, perhaps permanently, remains. The parts where most pain is experienced are the upper lip, particularly near the nostrils, the margins of the eyelids, and in some the neck. Then come the lower lip, the sides of the upper lip, the nose, forehead, bosom, and chest. There is, so far, no thoroughly satisfactory method of obtaining cutaneous anæsthesia during the operation. Accidents traceable to the operation are rare. If hairs in too close proximity are treated at the same time, death of the intervening skin may occur, and a depressed scar result. If a thickly implanted growth is removed, over a wide area, a degree of thinning of the tissue may ensue, yet even that is often recovered from. Sometimes keloid results in certain individuals. A proportion of the hairs treated grow again, but this is small in amount, and it is not wise to try too much to avoid recurrences. Partial destruction of the follicle may be followed by the production of a black, deformed, ugly stump. No very precise answer can be given to the inquiry, whether electrolysis, by the inflammation of the tissues which it occasions, tends to promote the transformation of downy into strong hairs. In some cases it may perhaps be incriminated, in others it would appear to have no such effect. After operating, the parts should be sopped twice or thrice daily with camphorated spirit.

EPIDERMOLYSIS BULLOSA.

WALLACE BEATTY has collected a large series exemplifying this peculiar and rare cutaneous affection (*Brit. Journ. Dermat.*, London, Aug. 1897). The main characteristics may be described as "the formation of bullæ on certain parts of the body after slight injuries, and the development of groups of subepidermic cysts or milia." Colcott Fox has furnished a valuable commentary on these cases (*ibid.*, Sept. 1897), and contributed a related one. The peculiarity of the complaint consists in the innate predisposition, so that the bullæ commence at a very early age, and continue to evolve throughout life, resisting all treatment. The disease is comparatively benign, though development suffers in childhood, and the health is in course of time to some extent affected. Fox thinks that the nervous system is profoundly involved in certain instances, while some die young. The most remarkable feature of all is the extraordinary vulnerability of the skin, whereby bullæ arise on the slightest provocation. With this is associated the selection of particular localities specially exposed to injury, the loss of the nails, the frequency of hæmorrhage into the blebs, and an atrophic or cicatricial condition of the integument; while the vulnerability, peculiar in this form of pemphigus, may exist in a lesser degree in other varieties. Some eruptions exhibit a tendency to attack regions exposed to traumatisms—so psoriasis, lichen planus, small-pox, etc., in course of evolution, are apt to show definite localisation of patches of the eruption on parts where pressure has been applied, as by garters, corsets, bands, or from scratches. This is exaggerated in epidermolysis bullosa, since the injury may be a very trifling one indeed. Though most of the cases commenced in early life, and some showed a hereditary element in their history, yet Fox's case at least supports the view that it may begin as an ordinary pemphigus in middle life, and apart from any family proclivity. The process seems to be a dermatitis, but whether the tendency to the occurrence of bullæ is due to an abnormality in the structure of the vessel walls, or to some defect of the vasomotor nerves of the parts affected, is as yet uncertain.

THE TREATMENT OF LUPUS.

AN important contribution to this has been made by William Anderson (*St. Thomas's Hosp. Rep.*, London, 1897, vol. xxv.). He points out that there are few chronic diseases which have brought more disappointment and less success than lupus. This obstinate resistance is a curious problem, for the affected tissues show fair evidence of natural reparative force; there is proof of this in the repair which nearly always goes hand in hand with destruction; the disease almost invariably confines its ravages to superficial structures, and rarely manifests the tendency of the typical malignant growths, to migrate to other parts through the lymph or blood stream. White swelling and caries are, like it, tubercular in origin, yet the hope of cure by surgical measures is far better. The difference in results he ascribes to timidity in scope of operation. Still, however completely the local disease may be removed, the constitutional predispositions remain, and are but to a limited extent under our control. He regards the disuse of tuberculin as but a temporary verdict; it will, he prophesies, sooner or later be perfected. The use of thyroid extract stands on a far less scientific basis; the most that can be said for it is, that the results are better than might have been expected. Some cases of lupus subjected to favourable hygienic and dietetic conditions, and treated with the extract, improve up to a certain point, yet a single instance of a complete and lasting cure can hardly be produced, and not a few cases deteriorate, both locally and constitutionally, under its influence. Of the operative measures, scarification acts slowly. It cuts up the morbid tissue into minute segments, apparently leaving the infective organisms to the vengeance of the phagocytes attracted to the part by the surgical summons. It may sometimes be used with advantage in the more superficial forms. When successful, the scar left is the best obtainable. For the cross-hatching a common scalpel is the preferable weapon. Afterwards, the immediate application of a 5 per cent. solution of pure carbolic acid is a valuable addendum, followed by the employment of a salicylic ointment, 20 grs. to the ounce. It is useless for lupus vulgaris of any great depth. Erasion, however thoroughly done, is disappointing. The curette is arrested by the fibrous floor and wall, and these are already invaded; hence in the new cicatrix, which often exhibits a fibroid thickening, fresh lupus tissue crops up, as also at the margins. To the scraped surface he now applies an ointment containing 20 to 30 grs. of salicylic acid, and 20 to 30 minims of creasote. Under this, cicatrisation proceeds rapidly, and the scar is more satisfactory. Excision is the method he prefers in all suitable cases. For patches not exceeding a crown piece in size, it is the most permanent and sightly. The wound may be treated in three different ways, according to circumstances. If small, it may be closed by suture, leaving a linear cicatrix; if large, it may be grafted either immediately or subsequently. Recurrence is exceptional in the cicatrix, or at the borders. New foci can be dealt with in the same way elsewhere. Where the areas are extensive, he has adopted the plan of excising the growing borders of the disease, vigorously curetting the rest, covering the whole with salicylic ointment until cicatrisation is well started, and then using epidermic grafts if necessary. Generally the process of repair in this way is so rapid, that the latter procedure is uncalled for. The third method of treating the wound is by gliding on to it a portion of skin from the neighbourhood. The removal of the active growing edge has a favourable, sometimes curative, effect on incipient or indolent patches beyond. Hollænder of Berlin has suggested (*Presse méd.*, Paris, 30th Oct. 1897) another method of dealing with lupus, however extensive. By means of indiarubber bellows, a current of air, heated above 300°, by passing through the flame of a lamp, in a tube ending in a fine point, is blown against the lupus patch. The intention is to produce a slow and progressive destruction of the morbid tissue. If the area is extensive, without the interposition of healthy islands, and in regions where cicatricial retraction is unimportant, absolute cauterisation may be produced. In other situations—as the nose, ears, lips, etc.—relative cauterisation is to be preferred, which does not occasion hideous scars. On parts so treated, while the normal skin becomes blanched and shrivelled, the lupous tissue swells up. In a few days the healthy integument resumes its normal aspect, while the lupous zone commences to mortify. One séance is insufficient to cure; as a general rule, it is necessary to repeat the cauterisation. Some illustrations which accompany the paper prove that great improvement at least results from this method. A third plan is that suggested by Stoker ("The Oxygen Treatment of Wounds, Ulcers, Lupus, etc.," London, 1897). The affected part is exposed to the action of pure or diluted oxygen, contained in an indiarubber bag or cap. The results of treatment by this mode are so meagre and incomplete that no conclusion can be drawn.

DISEASES OF CHILDREN.

UNDER THE CHARGE OF

G. H. MELVILLE DUNLOP, M.D., F.R.C.P.Ed.,

EXTRA PHYSICIAN, ROYAL HOSPITAL FOR SICK CHILDREN, EDINBURGH.

Unilateral Tremor occurring in Children.

Dr. Griffiths, in a paper read before the American Pediatric Society, relates two cases occurring in children, aged respectively 12 years and 18 months. He points out that unilateral tremor is a comparatively uncommon affection at any time of life, and that it is especially rare in children.

We naturally turn our attention to hemiplegia as the cause of this condition, but although choreiform movements and atheotosis seem to occur with reasonable frequency in children, as the result of a brain lesion, post-hemiplegic tremor appears to be much more uncommon. So rare, indeed, is this affection, that Sachs, in his "Nervous Diseases of

Children," makes no mention of it, and Osler, in analysing 151 cases of cerebral paralysis in children, found unilateral tremor in only one instance, though post-hemiplegic chorea was present in twenty-four cases, and atheotosis occurred six times. Rotch, in some remarks upon the subject, regards the symptom of unilateral tremor as entirely dependent upon faulty nutrition of the child, and that it has no connection whatever with any central lesion of the brain or spinal cord. The tendency is always for recovery to take place, if the nutrition of the child is carefully attended to. He relates the case of an infant who at 15 months was well developed, and who had commenced to say a few words, as well as to stand and sit up, when emaciation gradually set in, and was accompanied by unilateral tremor. By degrees the power of standing alone was lost, lateral curvature developed, the few words he had learnt were forgotten, the emaciation became extreme, and as it advanced the tremor became intensified. By regulating the feeding and the hygienic surroundings of this child, and by carefully attending to his nutrition, he made an uninterrupted recovery.—*Arch. Pediat.*, N.Y., Nov. 1897.

Gastric Ulceration in Children.

Whilst performing post-mortem examinations in children, and especially amongst the newly born, small superficial and multiple ulcerations of the gastric mucous membrane are frequently met with. Occasionally, hæmorrhagic erosions are found, a condition of matters most fully described by Vogel.

These erosions are scattered over the mucous membrane of the stomach, and are distinguished by their irregular borders, their blackish centre, and by the numerous spots of ecchymosis which accompany them. At other times one meets with those little ulcerations of the gastric follicles, to which Billard has assigned so important a rôle in the pathology of melæna neonatorum.

Cases of perforating ulcer in children, resembling Niemeyer's simple round ulcer of adults, are so rare as to make the following case particularly interesting. The child, who was two months old, had suffered for a month from diarrhœa and vomiting. The stools were yellow and slimy, but never contained any blood. The vomiting was continuous, the vomited matter being of a greenish colour. The abdomen became tympanitic, and the child gradually sank from exhaustion. On opening the abdomen, a pouch shut off from the rest of the peritoneum was observed, containing a very acid yellow fluid in considerable quantity, situated behind a fold of omentum. This pouch was bounded above by the posterior surface of the stomach and the inferior aspect of the liver, behind by the pancreas, and below by the transverse colon. On the posterior wall of the stomach towards the smaller curvature, and in the neighbourhood of the pylorus, a perforating round ulcer was detected, having clean, sharply-cut edges, and being about the size of a fifty-centime piece. The stomach contained a fluid similar to the contents of the pouch, by which it was connected by means of the perforation. No other lesion of the gastric mucous membrane existed, nor was anything else abnormal found in the abdomen.

In addition to the extreme rarity of such cases in children, the case is interesting on account of the absence of all symptoms usually associated with such a condition, especially the absence of any hæmorrhage either from the stomach or bowel. The age of the children in most of the previously published cases has been over 10 years, and the situation of the ulcer has been in the duodenum and not in the stomach, and very exceptionally has there been a history of perforation and peritonitis. —*Rev. mens. d. mal. de l'enf.*, Paris, Février 1898.

BACTERIOLOGY OF WHOOPING-COUGH.

DURING an epidemic of whooping-cough occurring at Königsberg, an examination of the sputum was made by Hensell and Czapleroski. The investigators were unable to discover the diplococcus described by Ritter, but in each of the thirty cases which they examined they demonstrated the presence of a small bacillus in the sputum. It consists of small short rods, with rounded ends, which very readily stain with the aniline dyes, especially the ends of the rods. The organism is motionless, possesses little resistance, and appears to be quite free in the sputum unenclosed in cells. The smaller forms resemble cocci, whilst those preparing for division resemble diplococci. Other bacteria, chiefly streptococci, are frequently found along with them, and when they are present in any quantity, the isolation of the whooping-cough bacillus becomes a matter of difficulty. Pure cultures form a greyish-yellow film in serum tubes, and grow on gelatin at 23° C. Attempts at inoculation of animals were unsuccessful.

The authors consider that they were justified in considering the organism the cause of whooping-cough, as, in some cases in which the diagnosis had not been arrived at, they prophesied attacks of whooping-cough from the presence of the organism in the sputum, and their predictions were verified later. Further proof was afforded by the fact that, during the investigation, one of the experimenters was attacked with whooping-cough, and in his nasal secretions large numbers of the bacilli described were present.—*Deutsche med. Wchnschr.*, Leipzig, 9th Sept. 1897.

INOCULATION OF INFANTS AGAINST DIPHTHERIA.

RIETHER, finding it impossible to stamp out diphtheria in a foundling hospital with which he was connected, determined to inoculate all the infants with Paltauf's diphtheritic antitoxin, as a prophylactic against the disease. Each child was accordingly inoculated with 100 units of the antitoxin, with the result that, out of 1450 children so treated, only two developed diphtheria, and in one of those cases the onset of the disease dated seven weeks after the inoculation. In the two years previous to the adoption of this treatment, no less than thirty-one cases of diphtheria had occurred, whilst in the second year of its adoption not a single case of diphtheria was recorded. The ages of the children varied from a few hours to several months.

The author, from what is probably the largest series of prophylactic injections against diphtheria hitherto published, claims to have proved that 100 units of antitoxin can safely be injected into even the youngest infant, and that it is sufficient to give the child immunity for five or six weeks.—*Wien. klin. Wchnschr.*, 1897, No. 28.

REPORTS OF THE MEDICAL SOCIETIES.

Edinburgh Medico-Chirurgical Society.—*2nd March* 1898.—Dr. Carmichael in the chair. Patients were exhibited by—(1) Dr. Gibson and Mr. Hodsdon, successful case of operation for perforated gastric ulcer; (2) Dr. Norman Walker, lichen scrofulosorum; (3) Mr. Annandale, excision of head of humerus for old unreduced dislocation; Mr. Stiles—(1) Congenital injured hernia, with vermiform appendix in the sac; (2) double hydrocele; (3) congenital dislocation of the hip. Dr. Bramwell—(1) Aneurysm pointing at the right breast; (2) tabetic club-foot; (3) progressive muscular atrophy, in which strychnine, hypodermically, was of no avail.

Specimens.—Mr. Annandale showed—(1) Meckel's diverticulum; (2) appendix adherent to the liver; (3) papilloma of the bladder; (4) parts from a case of excision of the elbow; (5) melon-seed bodies from an enlarged bursa; (6) specimens from a case of ruptured tubal pregnancy, with recovery after operation. Mr. Alexis Thomson, arrested development of the colour. Dr. Gibson—(1) Drawings from choroiditis in tubercular waxy disease; (2) drawings from a case of hæmorrhage into the cerebral ventricles. Dr. James read a paper on "The Various Forms of Cirrhosis of the Liver," dividing cirrhosis into two main groups—(1) The atrophic or portal; (2) the hypertrophic or biliary. In the former the symptoms are mainly those of obstruction of the gastro-intestinal circulation, with ascites, and the liver is shrunken. In the latter, the main symptom is chronic jaundice, and the liver is enlarged. The enlarged liver of biliary cirrhosis may become in time the small cirrhotic liver, with corresponding symptoms. Alcohol in large quantities and concentrated form may produce acute yellow atrophy. In smaller, long-continued doses, alcohol produces increase of fibrous tissue, plus disappearance of cells. The same irritant stimulates the liver-cell so much that it reproduces itself quickly in a less organised form, freqently degenerates, and sometimes dies. In the connective tissue the irritation results in reproduction. Dr. James sought to prove that new growths of the liver are the result of irritants which stimulate the liver cells to reproduction.

Edinburgh Obstetrical Society.—*Wednesday, 9th March* 1898. —Professor Simpson, Vice-President, in the chair.

Communications.—Dr. Owen Mackness read a paper on "The Use of Quinine as a Substitute for Ergot in Midwifery." He pointed out the disadvantages of ergot, and claimed that quinine was better than ergot during labour, since it was certain in action, easily administered, and did not produce tetanic contractions, but merely increased the strength of the existing labour pains. He generally gave 8 grs. of the sulphate, and after an hour 4 grs. more, if necessary; and he found that such doses markedly hastened labour and obviated the use of forceps.

Dr. **Freeland Barbour** read his paper on "The Cervix Uteri and Attitude of the Fœtus in Leopold's Sections." He pointed out that the condition of the cervix in these sections gave no support to the view that the lower uterine segment was derived from it. With regard to the attitude of the fœtus in pregnancy, the fact that the umbilical cord might affect this was discussed. In three of Leopold's sections the cord was twisted round the limbs, disturbing the normal attitude, but in two of the cases the breech position was accidental, developing just before death.

Dr. J. W. **Ballantyne** read a note on "Three Cases of Congenital Teeth." In a face presentation the upper central incisors were present; in another, the teeth after birth sloughed out, the alveoli necrosed, and the child died; in the third, that of a syphilitic child, the teeth broke down, and the mother became infected.

Royal Medical Society.—*18th February* 1898.—Dr. H. S. **Ballantyne** in the chair. Dr. **Beesley** read his dissertation on "The Management of the Perineum during the Second Stage of Labour," in which he discussed the anatomy of the pelvic floor, and the immediate and remote effects of rupture of the perineum, specially noting puerperal fever among the former, and procidentia uteri among the latter. Dr. T. A. Ross showed specimens, and described the symptoms of a malignant adenoma of the stomach, in a man, æt. 35. He had manifested no symptoms of gastric disturbance, and died from an attack of croupous pneumonia. The inner wall of the stomach was covered with nodules, varying in size from a barley-corn to a pigeon's egg. There were secondary growths in the liver and kidneys. Dr. J. B. **Jamieson** described a case of calcified hæmatoma, from a trauma. It had existed twenty-five years without causing any pain. On palpation it was crepitant, and felt like grains of sand in water. When cut into, a milky, sandy fluid escaped, and the walls were seen to be lined by cretaceous material. This was dissolved by plugging the wound with gauze soaked in a 5 per cent. solution of hydrochloric acid. The discharge was found to contain calcium chloride, carbonate, sulphate, and phosphate, magnesium phosphate, with a trace of calcium fluoride and oxide of iron. Dr. P. **Herring** read a communication on some syphilitic lesions of the eye.

25th February 1898.—Dr. G. L. **Chiene** in the chair. Dr. **George Mackay** gave a communication on "The Illustration of some Foreign Bodies on the Eye and their Treatment." Bodies of considerable size might lodge in the conjunctival sac, and escape notice for a long period, as in the case of a man complaining of irritation of the right eye. There was a large pedunculated granulation, from which a large barleycorn spurted out. This had remained in unobserved for six years. A temporary induced myopia occurred in one case, from penetration and lodgment of a pellet at the outer side of the left eye. When the foreign body was removed the unilateral myopia disappeared. In cases where, on account of the opacity of the media, the ophthalmoscope failed to detect the presence of foreign bodies, the use of the Röntgen rays was now of great service. Dr. PURVES read his dissertation on "Notes on a Series of Cases of Appendicitis." In the diagnosis of appendicitis the temperature did not form a reliable guide to the severity of the disease. In discussing the treatment he strongly advocated early surgical interference, if improvement did not rapidly take place under the usual medical means.

4th March 1898.—Dr. E. E. PORRITT in the chair. Dr. G. W. STRUTHERS showed a case of thoracic aneurysm, which had eroded the ribs, and caused a swelling extending from the second to the seventh costal cartilage on the right side, and attaining the size of a fully developed mammary gland. The radial pulse was different on the right and left sides. Dr. ARMOUR gave a communication on the case of a girl, æt. 16, who suffered from cerebral congestion. Mr. PEEL RITCHIE described the case of a man, æt. 60, with a large suppurating hydatid cyst to the right side of the spinal column, posteriorly. When opened, a thick greenish pus escaped, containing hooklets of the scolices and daughter cysts.

GLASGOW PATHOLOGICAL AND CLINICAL SOCIETY. — *14th March* 1898.—Dr. DONALD FRASER in the chair. — Dr. ALEXANDER NAPIER showed photographs and skiagraphs from a case of acromegaly in a woman, æt. 40, who had shown symptoms for fifteen years. It was noticed that her hands and her feet were slowly enlarging, which they progressively did for two years. There has been no appreciable enlargement since then, thirteen years ago. At this time also her features underwent a change; the face became elongated, the superciliary ridges, the nose, tongue, lower jaw, became thickened and hypertrophied. The hair became thick and coarse; the voice deeply pitched. More recently the eyes showed a tendency to exophthalmos with right divergent squint. Now there is complete optic atrophy in the right eye, with hemianopia on nasal side in the left. There is distinct enlargement of both lobes of the thyroid, with variable pulsation; no palpitation. Fourteen days ago she had a severe epileptic fit, followed by the appearance of albumin in the urine; there was none previously. She is lethargic but intelligent. Treatment consisted first in the administration of tabloids of ovarian extract, with slight improvement. Latterly she has been having tabloids of pituitary extract. She has lost 13 lbs. in weight since admission.

Dr. DALZIEL showed—(*a*) A large retroperitoneal lipoma removed from a child; (*b*) a patient operated upon successfully for rupture of the bladder involving the prostate and peritoneum; (*c*) a large gallstone removed from the common bile-duct of a lady who had suffered for many years from severe colic.

GLASGOW MEDICO-CHIRURGICAL SOCIETY.—*4th March* 1898.—Dr. J. H. NICOLL showed a patient whom he had trephined for symptoms of intracranial pressure after a fall. They consisted in right frontal headache, vomiting, and giddiness. At the first operation the frontal lobe was explored by a trocar, with temporary relief. The second operation followed on the recurrence of symptoms, when the trocar was passed into the sphenoidal lobe, into the lateral ventricle, from which a good deal of fluid was withdrawn, and into the cerebellum and occipital lobe, with negative results. Slow recovery followed, and the patient is now well. Dr. Nicoll supposed there had been thrombosis of the anterior longitudinal sinus, and consequent blocking of the veins of Galen.

Dr. **Newman** showed specimens from four cases of tumour of the bladder, in three of which he had operated. These three were papillomata; in the first case a suprapubic operation was performed, in the second and third the tumour was removed, per urethram, by the electric cautery. The fourth case was inoperable, being a sarcoma, with profuse hæmaturia. Finally, Dr. Newman showed specimens relating to a series of cases of malformation of the kidney, grouping them under displacements and malformations proper.

Forfarshire Medical Association.—This Society met in Dundee on *4th March* 1898.—Dr. G. O. C. **Mackness**, Vice-President, in the chair. The **Secretary** showed, for the President, Shaw's self-retaining operating vaginal speculum. Mr. **Greig** showed a specimen of an old-standing intracapsular fracture of the neck of the femur. Dr. G. F. **Whyte** showed a heart, in which the anterior wall of the right ventricle was calcified with numerous pericardial adhesions. Dr. **Kynoch** (1) showed a uterus removed by vaginal hysterectomy for cancer of the cervix; (2) a specimen of myxomatous degeneration of the chorion. Dr. **Stalker** read notes of a case of spinal myelitis of syphilitic origin, with girdle pains, paralysis of the lower limbs, hyperalgesia in parts, incontinence of urine, exaggeration of deep reflexes, with absence of rigidity. The case improved rapidly under treatment, the sensory symptoms being the first to yield. Dr. Stalker showed how it differed from ordinary cases of myelitis, from which Erb was the first to mark them off. Dr. **Buist** read notes of the treatment of cystocele, describing the more recent operations, and gave notes of a case on which he had operated, by a vertical incision in the anterior vaginal wall. The result of the case was relief, without recurrence six months after. Dr. **Halley** read notes of a case of acute general erythema, following a septic ulcer, in a man æt. 70, who had suffered for several years from an ulcer of the leg. His ulcer became septic and gangrenous; at the same time, his whole body became covered with an erythematous rash, without rigor or sore throat, but the temperature rose to 101°. It was considered advisable to amputate the limb through the middle of the thigh, when the rash disappeared, and desquamation commenced immediately. Dr. Halley considered that the rash was probably due to septic intoxication, and quoted similar cases in support of this view. Mr. **Greig** read notes of cases under his care, when eczema and erythema had followed antiseptic dressings, and of a case in which he had operated twice for the same complaint, using the same dressings, with an interval of several years between the operations. After the second operation delirium and erythema occurred. He considered that the erythema in these cases was due to the absorption of some toxic substance, but not due to sepsis.

OBITUARY.

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Sir Richard Quain, Bart., M.D., F.R.S.

Richard Quain, whose death we have to mourn, was born at Mallow, County Cork, on 30th October 1816. He belonged to a family of which at least three other members, his cousins, rose to distinction—Justice Quain, Jones Quain the anatomist, and Richard Quain the surgeon. The story of his professional life opened when he was but 15, in the town of Limerick, and nearly came to a premature close when funds ran short at the end of his apprenticeship and he was sent to try his hand at tanning. But fate had greater things in store for Quain. January 1837 found him a student of medicine at University College, London. Now he could satisfy his craving for learning and action. He took a leading position at once in all the classes, maintained it throughout his student's course both at University College and the University of London, and crowned his career by holding the posts of house-surgeon and resident medical officer.

His education finished, Quain's natural energy found vent for itself in different directions. He worked quietly at pathology, and the result was his famous monograph on fatty degeneration of the heart, unquestionably a piece of genuine and thoroughly original research, of which he was legitimately proud till the end of his life. He produced a good deal of other pathological work, sound, valuable, and fruitful in immediate results. He helped to found the Pathological Society of London, and rose to occupy the chair. To the end he was ambitious to do original work; and in the course of his last illness he prepared a paper on the cause of the first sound of the heart.

What Quain became as a craftsman in physic all the country knows. Undoubtedly he was a skilful practitioner—a "good doctor." He was not gifted with Gull's remarkable faculty of bodily and mental analysis, by means of which the patient was to him as an open book; Quain possessed rather an intuition or instinct that told him at a glance what was the matter and what ought to be done. Add to this his geniality, kindness, and cheerfulness; and his success is explained.

The third direction in which Quain expended his energy was public life. From morning till night—and night with Quain meant early morning, for he habitually retired at three or four o'clock, prefacing his hours of silent labour with a sound sleep after dinner—he thought and worked for Medicine as a profession. Medical education, medical politics, the College of Physicians, the University of London, the Brown Institution, the Brompton Hospital, the Fitzroy Home-Hospital—let any friend call and raise one of these topics, and immediately practice, patients, and correspondents were forgotten. Action was his chief delight. "Utility and Progress" was his favourite motto. It is no wonder that he came to occupy the highest positions in connection with these public institutions. Another public position of which he was always proud to speak was that of member of the Royal Commission on Cattle Plague in 1865, along with Earl Spencer, Lord Salisbury, Lord Sherbrooke (Robert Lowe), and Lord Playfair.

To the younger generation of practitioners and students Quain is probably best known as the editor of the "Dictionary of Medicine," which proved a great success in every respect. He hoped—but in vain

—to find time to write a work on diseases of the heart; the effort never went further than a very notable series of Lumleian Lectures. In his earlier years he wrote regularly for *The Saturday Review* on subjects related to the medical sciences.

Socially, Sir Richard Quain led a very happy life. He was the intimate personal friend of more than one generation of the leading politicians, scientists, writers, painters, and actors of the country, and possessed many tangible tokens of the respect and regard they entertained for him. Short of stature, strongly marked in facial features, with ready smile and kindly greeting, and dressed after the fashion of half a century ago, Quain was known and welcomed wherever he went. He was equally famous as a hospitable genial host, and as a cheerful, amusing guest; witty, happy, a *raconteur* of the first order. His personal kindness to younger men was unbounded in the best of all directions—in giving them sound advice, and the assistance of his great influence, when the time came.

The last year of life was rendered miserable by a complication of diseases; and he died of exhaustion on Sunday, 13th March, at the advanced age of 81 years and 6 months.

ALFRED WATKIS ROBY FLETCHER, M.A., M.B., B.Sc.

THE early death of Dr. Fletcher adds another name to the long roll of missionary martyrs. After a distinguished career at Edinburgh, characterised not only by scientific attainment and professional success, but even more by healthy influence and public spirit, he became a medical missionary of the Free Church of Scotland, and entered upon his duties in Livingstonia with high promise of usefulness in his adopted sphere of action. The hopes which were centred in him have been shattered by the brief telegraphic intimation of his death. This sad event is deeply mourned by the wide circle of his friends.

WILLIAM BROWNE AITKEN, M.B.

WE regret to observe the death of Dr. Aitken of Sale. An old alumnus of Edinburgh, like his father, the late Dr. Aitken of Inverness, he had for the last nine years been in practice at Sale, where he was held in high esteem and great respect. His death, at the early age of 35, has cast a deep gloom over the district.

A. J. TRAVERS ALLAN, M.B.

WITH feelings of the deepest regret we chronicle the death of Dr. Travers Allan, at the early age of 22. Though one of the youngest of our graduates, he ranked as one of the best known members of the profession, through being at the time of his death the amateur golf champion. His comparatively short acquaintance with the game, his inimitable ease and grace of style, and above all the unassuming manner in which he carried the much-coveted honour, have already been the theme of universal eulogy. Admired by his teachers, and loved by his fellow-students, his removal has cast quite a gloom over university circles, and we feel that in the ranks of our profession a gap has been formed which must be difficult to fill.

MONTHLY NOTES
ON METEOROLOGY AND VITAL STATISTICS.

By A. LOCKHART GILLESPIE, M.D., F.R.S.E., F.R.C.P.Ed.,

MEMBER SCOTTISH METEOROLOGICAL SOCIETY.

Meteorological Means for the East of Scotland District, for the Four Weeks ending February 26, and for the Year from January 2.

	Temperature.			Rainfall in Inches.		Sunshine. Hours.		Mean Daily Variability of Temperature.
	Mean.	Accumulated Day-Degrees. Above 42°.	Accumulated Day-Degrees. Below 42°.	Actual.	Accumulated from Jan. 2.	Actual.	Accumulated from Jan. 2.	
Mean .	37°·8	*[1] 39°	187°	2·25	5·0	55·0	91	2°·9
		[2] 64°	349°					
Observed	38°·7	[1] 28°	135°	2·0	3·2	83·0	109	3°·4
		[2] 120°	193°					
Difference	+0°·9	[1] −11°	− 52°	−0·25	−1·8	+28·0	+18	+0°·5
		[2] +56°	−156°					

Vital Statistics.

Mortality in Four Large Towns in the East of Scotland, during February, and since January 1. Actual Numbers and Rate per 10,000 per annum.

	Total.		Constitutional Diseases.		Circulatory System.		Nervous System.		Respiratory System.	
	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.
Deaths expected and Mean Rate for 1891–1896	[1] 1157	205·2	210	37·2	98	17·3	121	21·4	275	48·8
	[2] 2438	213·3	415	36·3	216	18·9	260	23·0	580	50·7
Actual Deaths and Rate per 10,000	[1] 955	169·3	218	38·6	94	16·6	107	18·9	165	29·2
	[2] 2036	178·1	440	38·5	197	17·2	244	21·6	410	35·8
Difference from Mean	[1] − 202	−35·9	+8	+1·4	− 4	−0·7	−14	−2·5	−110	−19·6
	[2] − 402	−35·2	+25	+2·2	−19	−1·7	−16	−1·4	−170	−14·9

	Digestive System.		Urinary System.		Pneumonia.		Phthisis.		Cancer.	
	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.
Deaths expected and Mean Rate for 1891–1896	[1] 64	11·4	29	5·07	90	16·0	107	18·7	47	8·3
	[2] 137	12·1	55	4·8	188	16·5	208	18·2	94	8·3
Actual Deaths and Rate per 10,000	[1] 78	13·6	23	4·02	71	12·6	101	17·6	55	9·7
	[2] 159	14·0	50	4·4	176	15·4	107	18·12	109	9·5
Difference from Mean	+14	+2·2	− 6	−1·05	−19	−3·4	− 6	−1·1	+8	+1·4
	+22	+1·9	− 5	−0·4	−12	−1·1	− 1	−0·08	+15	+1·2

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* Note.—The figure [1] denotes the data for February, [2] for year to date.

The month of February was characterised by a marked predominance of westerly winds, especially of those from a point north of west, which blew with a force almost thrice the average pressure; by a slight decrease in the rainfall, but an exceptionally low humidity; by an increase in the hours of bright sunshine, in the mean temperature, and in the mean daily variability of temperature. The figures accumulated for the first two months of the year are remarkable for the great decrease in day degrees below 42°, 156° out of 349°, a proportionally larger increase in the day degrees above 42°, 56° over 64°, a small rainfall, and a greater number of hours of sunshine than the average.

The total number of deaths was very much below the average, 955 in place of 1157, chiefly due to the remarkable decrease in fatal cases of respiratory diseases. Only constitutional and digestive diseases and cancer caused an increased mortality. Seventeen deaths were recorded as directly due to influenza. The data from the beginning of the year are in exact accord with those for February. The increase in the number of deaths from diseases of the digestive system is of interest in connection with the unusually high temperatures recorded during a large part of January and the earlier part of February. The influenza epidemic, prevalent in a subacute form, appeared to be also affected by the abnormal amount of warmth, and to have been marked rather by the gastro-intestinal symptoms which usually accompany summer epidemics, than by the ordinary respiratory type common to winter attacks.

February, therefore, with slight excess of warmth, extreme dryness of the air, unusual wind-pressure, and increased variability of temperature from day to day, was characterised by a marked lowering in the death-rate, an extraordinary diminution of deaths from lung diseases, and an increase of deaths from digestive disorders. The year to date with the same meteorological phenomena has been characterised by similar mortality returns.

SCHOOL OF MEDICINE OF THE ROYAL COLLEGES, EDINBURGH.

At a meeting of the Governing Board of the School of Medicine of the Royal Colleges, Edinburgh—Dr. G. A. Gibson presiding—the Secretary, Mr. R. N. Ramsay, reported that the number of students attending the school during the current winter session was 1184, an increase of 285 as compared with the corresponding session of the previous year.

EDINBURGH
MEDICAL JOURNAL.

ORIGINAL COMMUNICATIONS.

OVARIAN TUMOURS SIMULATING INFLAMED OVARIES, INCLUDING A CASE OF OVARIAN MYOMA.

By ALBAN DORAN, F.R.C.S., *Surgeon to the Samaritan Free Hospital, London.*

IN these days when medical education is well diffused, and ovariotomy widely undertaken by general surgeons, the diagnosis of an ovarian tumour is seldom deferred till dangerous complications have set in, and few surgeons shrink from operating as soon as the tumour has been detected. Experience shows that, as a rule, an ovarian tumour gives no trouble when it is small, complications rarely beginning till some time after it has risen above the pelvis. At the same time, a tumour of this kind is best removed when it is diagnosed, for, the earlier the ovariotomy, the less will be the risk.

On the other hand, the hasty removal of swollen inflamed ovaries is greatly to be deprecated. Taking into consideration certain familiar symptoms, a tender, more or less movable, body in Douglas's pouch usually proves to be an inflamed ovary; and, as a rule, it will cease to be tender after appropriate medical treatment. But it sometimes happens that an ovarian tumour in its earlier stages, before it rises into the abdomen, may become tender, or that pelvic symptoms, really due to inflammatory changes in the uterus or opposite ovary, may interfere with diagnosis. I have come across a considerable number of such cases in my own operative practice. I will set aside instances of more or less fixed sessile pelvic cysts, including such as, when menorrhagia and elongation of the uterine cavity are present, simulate uterine fibroid. I will confine myself to six cases where there was in each instance an enlarged ovary, and where before operation the cause of enlargement was not clear, though the suspicion of a new growth justified exploration.

The question of diagnosis is important, and the consultant in these cases finds himself in a difficult position. Last year, after taking part in some consultations on disputed cases, I looked up some of my own records, and prepared a few notes. In searching through recent medical literature, I found that my work had been to a certain extent anticipated in an excellent article on ten cases of small ovarian tumours, prepared by Dr. Davenport of Boston, U.S.[1] The clinical notes, however, are not so complete as might be desired, the pelvic examination, a most important matter, being imperfectly recorded. I have selected six cases only, from my own practice, after rejecting a considerable number where there remained small doubt as to whether the cystic degeneration of the ovary represented a true neoplasm.

In the first case, an incipient ovarian cyst gave pain as in simple inflammation of the ovary, through being incarcerated in Douglas's pouch.

Case 1.—E. H., æt. 35; married fifteen years, three children; last confinement, twelve years; no abortions. For two years, almost constant abdominal pain. For three weeks severe pain in abdomen. Period regular, four-weekly, always *scanty*; pain on last three occasions.

Abdomen distended by flatus. Uterus usually fairly movable; a small *tender* oval body to the right of the cervix, and a large *tender* body to the left; its surface felt irregular.

Operation, 11*th Feb.* 1891.—The left ovary formed a characteristic cystoma as large as a hen's egg. Papillomatous growths were found on its inner wall. It lay in Douglas's pouch, incarcerated as it were by the utero-sacral ligaments. The right was smaller, but also cystic. Both ovaries were removed. There was not a trace of any adhesion. I saw the patient six years later; no sign of any period had ever been seen since the operation. For two or three years she suffered from flushing of the cheeks, headaches, etc., as at the true menopause. I have found that the dread of an "operative" menopause has been much exaggerated, though it must be taken into account.

In this case there was distinct tenderness, as is so frequent in inflammatory disease of the ovary; whilst hundreds of ovarian cysts develop in the pelvis, and rise above its brim without becoming painful. The cause of the unusual pain seemed to be the incarceration of the tumour. The utero-sacral ligaments sometimes grip an exogenous cyst, projecting from the lower part of a large ovarian tumour; and the same accident may happen to a pedunculated myoma of the uterus. It is, however, quite unusual for an entire cystoma of the ovary to be incarcerated in this manner. The utero-rectal muscles which run in the borders of the utero-sacral ligaments are clearly too weak to resist the upward advance of most tumours which develop in the deepest part of the pelvis;[1] in this instance it was apparently otherwise. It is a factor to be remembered, and I suspect that it often aggravates the pain when an inflamed ovary slips into Douglas's pouch.

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[1] "The Diagnosis of Small Ovarian Tumours," *Boston Med. and S. Journ.*, 1896, vol. cxxxv. p. 353.

The ovary was undoubtedly the seat of a true tumour, which had developed in the hilum, and, as is the rule under such conditions, it was papillomatous, and pushed the normal ovarian tissue aside instead of absorbing it.[2] In short, it was neoplastic, and not inflammatory.

The absence of menorrhagia rather favoured the diagnosis of a tumour. In the next case the trouble was due to a juvenile dermoid.

CASE 2.—M. M., æt. 44; widow; last confinement thirteen years. She had suffered for nearly a year from severe pain, distinctly referred to the right side of the pelvis. The attacks were accompanied with dysuria. Catamenia perfectly regular, show moderate.

On 26th February 1892 I made a note, "Uterus small; to left is a soft tender body, apparently adherent to pelvic wall." On 11th April, same year, "The tender body is about double the size it had obtained in February, and can be pushed upwards."

Operation, 14th April 1892.—I removed a cystic tumour 3 in. in diameter; it had developed in the left ovary, and was absolutely free from adhesions. It contained 3½ oz. of pale yellow fat, mixed with hairs. The pedicle was narrow and rather short; it was not twisted. The right ovary and uterus were quite healthy and free from adhesions. The catamenia remained regular till just three years after the operation; then they ceased abruptly, when the patient was 47, never to return. Last autumn there was no evidence of any morbid change in the right ovary.

Severe pain and a soft tender body were the principal clinical features in this case. As in the last, I could not feel sure whether the swelling was a new growth or an ovary subject to purely inflammatory changes. Pain in the pelvis, referred to the side opposite to the seat of disease, is quite common in chronic oöphoritis. It was not necessarily due to the uterus being pushed laterally by the swollen or cystic ovary, as displacements from that cause do not specially accompany this curious symptom. As for the severe attacks, with dysuria, it is possible that they were due to occasional rotation of the pedicle. Ovarian dermoids are subject to this complication, even when they are small, and clinical histories indicate that partial rotation may be reversed, the pedicle once again lying normally.

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[1] No doubt many ovarian cysts never sink so low, but rise out of the pelvis almost from the first.

[2] This condition is demonstrated in a similar specimen which I described some time ago, in a paper on "Papillary Cysts of the Ovary," *Trans. Path. Soc. London*, vol. xxxiii. Plate ix. Figs. 2 and 3. The cyst described above is preserved in the museum of the Westminster Hospital, Series "Morbid Anatomy and Pathology," No. 1030. See footnote, Case 4.

The main truth was that the swelling proved to be a true neoplasm, for an ovarian dermoid cannot be looked upon as in any sense a product of an inflammation.[1]

I spared the opposite ovary, and the disease had not recurred over five years after the operation. Pfannenstiel[2] condemns all healthy ovaries, fellows of cysts, and solid tumours, in patients over 40; but, at least in the case of dermoids, his principle may be questioned.

The next case is an instance of hæmorrhage into the ovaries, which may occur both in oöphoritis and in cystoma of the ovary.[3]

Case 3.—Mrs. H., æt. 25; single. For a year she had been under the care of Dr. J. Williams, of Connaught Street, W., on account of pain in the loins and left iliac fossa; dysuria was marked. The catamenia appeared nearly every two weeks, with free show; small clots occasionally passed, with much pain. The temperature rose to 99°·8 at night on several occasions.

Uterus pushed to the left, cavity 3 in. Left appendages tender, swollen, fixed, and lying in Douglas's pouch; a swelling in right fornix.

Operation, 12*th Dec.* 1895.—The right ovary was converted into a cyst containing 4 oz. of tarry blood; the tube and mesosalpinx were quite healthy. The left ovary was also cystic and full of blood, with a sound tube and sound ligament. It was strongly adherent to the pelvic structures. Both appendages were removed. Nine months later, the patient, who had never menstruated since both her ovaries were removed, was in fair health. There were flushings and insomnia, but though the patient had been neurotic for several years, the premature menopause was not marked by severe symptoms.

Here there was marked menorrhagia, and inflammation assuredly existed, but the uterus was involved,[4] and the free discharge of blood from its cavity possibly had little or nothing to do with the cysts. The ovaries, as I found on examination, were primary cystomata, but had clearly become inflamed later on; hence, probably, the hæmorrhage into the cavities of the cysts. These bleedings are not rare in oöphoritis; thus, clinically and anatomically, a small inflamed cystoma may be hard to distinguish from an inflamed ovary.

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[1] A follower of Küster might speculate as to what would have happened had the operation been deferred for a few months. That observer believes that a dermoid tends to rise in front of the uterus, and to lie well in the middle line, so that if displaced sideways or downwards it rapidly slips back to its favourite site. Mandelstamm (*Gynécologie*, 1896, p. 179) attributes this alleged peculiarity to the lightness of a dermoid. But a heavy fibroma of the ovary may lie in front of the uterus.

[2] "Ueber Carcinombildung nach Ovariotomien," *Ztschr. f. Geburtsh. u. Gynäk.*, Stuttgart, 1894, Bd. xxviii. He emphatically repeats the above statement in his treatise on "Die Erkrankungen des Eierstocks und des Nebeneierstocks," in Veit's "Handbuch der Gynäk.," 1898, Bd. iii. part 1, S. 486.

[3] In Davenport's Case 4, there was hæmorrhage into a cyst; in Case 9, a hæmatoma of one ovary, its fellow being cystic.

[4] Davenport notes, in relation to his own cases: "There seems to be a direct causal connection between severe uterine hæmorrhage and cystic ovaries which are closely adherent to the uterus." The left ovary adhered in this case, but the condition of the uterus explained the menorrhagia. In the main, Davenport's experience agrees with my own.

Between inflammation and neoplastic growth lies papillomatous degeneration, of which the next case is an instructive example.

CASE 4.—S. B., æt. 28; married eleven years; miscarried two years previously, and a parametric abscess burst above the right groin. A hernia developed, and ultimately gave great trouble. For seven weeks before I saw her she complained of pain in the *left* iliac fossa. The catamenia were regular, four-weekly; the show always scanty; the last three periods were unusually painful. On 6th March 1896, I detected a large tender swelling in the *right* fornix, pushing the uterus to the left. I kept her at rest for a while, and on 5th July 1876 operated, with the intent of repairing the hernia only, as the pelvic swelling had grown less after rest, so I concluded that it represented a purely inflammatory condition, which had almost subsided.

The hernial pouch proved very difficult to excise; I have described the process elsewhere.[1] In the course of the operation I fortunately explored the pelvis. Then I found that the appendages were extensively diseased on both sides, the tubes were dilated, the ovaries cystic. There was papillomatous degeneration of the left tube, and papillomatous growths in the interior of the cyst which made up the right ovary. I removed both appendages. The patient was free from all pelvic pain eighteen months after the operation, yet she continued to menstruate, although the total removal of both ovaries was easily effected.

Here it is clear that the disease was of inflammatory origin, probably dating from the abortion. Yet there was no menorrhagia; on the contrary, the catamenia were scanty. I have found that papillomatous degeneration, the result of inflammation, may be the origin of an exuberant papillomatous tumour, which in turn may become cancerous.[2] Indeed, primary cancer of the Fallopian tube seems as though it usually arose in this manner; whilst the surgeon must not hesitate to remove a cystic ovary containing papillomata, whatever the growths may mean. I admit that the diffused papillary masses sometimes found free in the pelvis and abdomen have been known to prove clinically innocent, to the great satisfaction of operator and patient. In such a case these are probably pure products of inflammation, and an exploratory incision cures it, just as it cures tubercular peritonitis—how we are not precisely certain. Still, a removable papilloma should always be removed, especially when situated in the ovary or tube, for reasons just explained.

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[1] "Hernia of the Abdominal Cicatrix, and Operations for its Cure," Case 3, *Lancet*, London, 1897, vol. ii. p. 1379.

[2] I have discussed this question in a treatise on "Diseases of the Fallopian Tubes" in Allbutt and Playfair's "System of Gynæcology." These papillomata are pathologically quite different from papilloma of the hilum, as in Case 1 of the above series. The latter arises from vestigial relics.

In the following case there was uterine inflammation from retained portions of placenta, and an incipient ovarian cyst, which could not readily be distinguished from a swollen inflamed ovary.

CASE 5.—E. M., æt. 41; married eleven years; four children, last 13 months old. She had never felt well since a miscarriage, over two years before she came under observation. She was for some time under the notice of Mr. Corrie Keep, who found the uterus enlarged; and the catamenia, which occurred regularly once a month, were very free, often lasting for several weeks. There was a swelling in the right fornix, which was slightly tender; it increased in size, whilst the uterus was reduced after the treatment to its normal size, decidua being removed by scraping. The patient complained of severe pain in the right iliac fossa and sacral region.

Operation, 21st January 1897.—I removed a cystic tumour of the right ovary as large as a Tangerine orange. There were no adhesions nor evidence of inflammation. The tube was free from disease. The left ovary was perfectly healthy, and was left alone; yet it is remarkable that five months later the patient complained of flushings, and of feelings of faintness, as occur in the real or premature menopause. The period was regular.

In this case there was, I suspect, pure coincidence of endometritis and incipient cystoma of the ovary. The former was due to retained fragments of decidua, and the uterine hæmorrhages had nothing to do with the cyst. It is very doubtful if a cystoma, or any tumour save papilloma, can be set growing by inflammatory changes in its neighbourhood; the question cannot safely be discussed in relation to any single case. The fact that the cyst was tender is no proof that it was inflamed, as there was tenderness in Case 1, where no inflammation was present. In that instance the cause seemed clear, in the present case it remains uncertain.

The last case is an instance of true myoma of the ovary, a rare disease.[1]

CASE 6.—A. B., æt. 27; single, lame in the left leg from infantile paralysis; began to suffer early in the spring of 1897 from severe bearing-down pains. Early in September they grew so violent that she took to her bed. The catamenia appeared about every twenty-fourth day; the interval tended to grow less since the illness set in. The show was moderate, a little increased since the spring, and there was much pain during the first two or three days. On 27th November, Dr. Percy Boulton removed the posterior lip of the cervix, which was enlarged and contained a small cyst. On exploring the pelvis, he then suspected that there was a new growth in Douglas's pouch, rather than inflammatory disease, such as had previously been suspected. Dr. Boulton transferred the case to me for operation.

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[1] Davenport claims a fibro-*myoma* in his series (Case 6). "Dr. Whitney's report says: It is a fibro-myoma. The outer wall is composed of a dense, fibrous structure, and within is a loose connective tissue growth, gradually passing into the centre, where the cells are separated by *a soft gelatinous substance* for quite a distance." Not a word is said about plain muscle cells, and Dr. Whitney's note on "gelatinous substance" clearly indicates that *myoma* is a misprint for *myxoma*. Amongst other writers who have removed myomata of the ovary, are Dr. C. H. Carter (*Trans. Obst. Soc. London*, 1887, vol. xxix. p. 190), and Dr. Brigg's Case 1 (doubtful), *loc. cit.*).

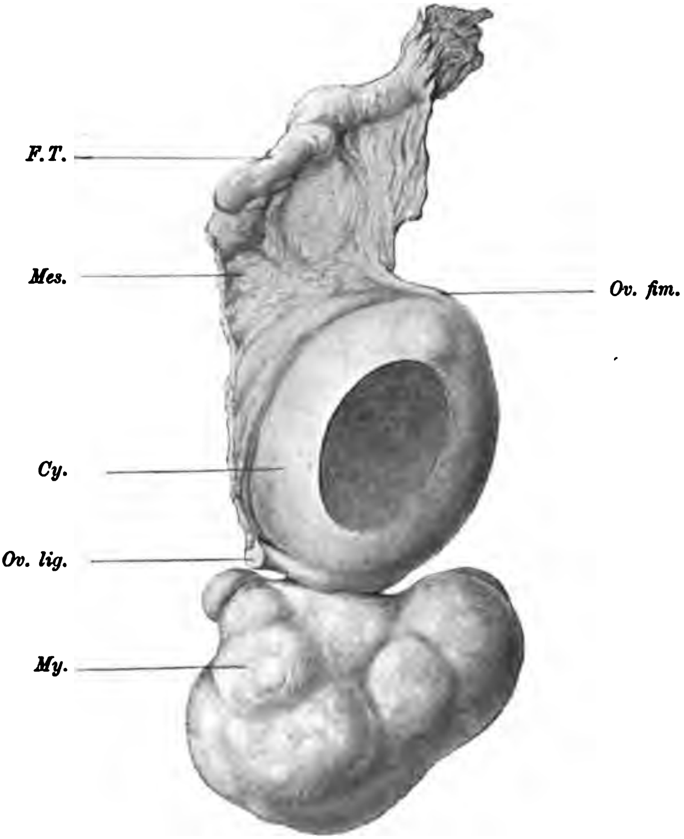

FIG. 1.—Myoma of the ovary, Case 6 (nat. size.) *F.T.* Fallopian tube. *Mes.* Mesosalpinx, not involved in the growth. *Cy.* Ovarian cyst. *Ov. fim.* Ovarian fimbria of the tube passing on to the cyst. *Ov. lig.* Ovarian ligament, divided at operation close to uterus. It runs directly into the junction of the cyst to the vagina. *My.* Solid myoma, showing the groups of myomatous nodules (as often seen in interstitial uterine fibroids) of which it was made up.

The uterus was 3 in. long, and retroflexed. In the left fornix was a hard oval mass, quite movable, and in Douglas's pouch a more elongated elastic mass, apparently connected with the former.

The operation, performed on 14th December 1897, was perfectly simple. I passed my hand into Douglas's pouch, and drew up the curious double tumour here figured. It sprang from the right side of the uterus. I was struck with the great hypertrophy of the ovarian ligament (Fig. 1, *ov. lig.*), and carefully noted its course before I divided it. The left ovary was free from disease. As might have been expected, no complications occurred during convalescence.

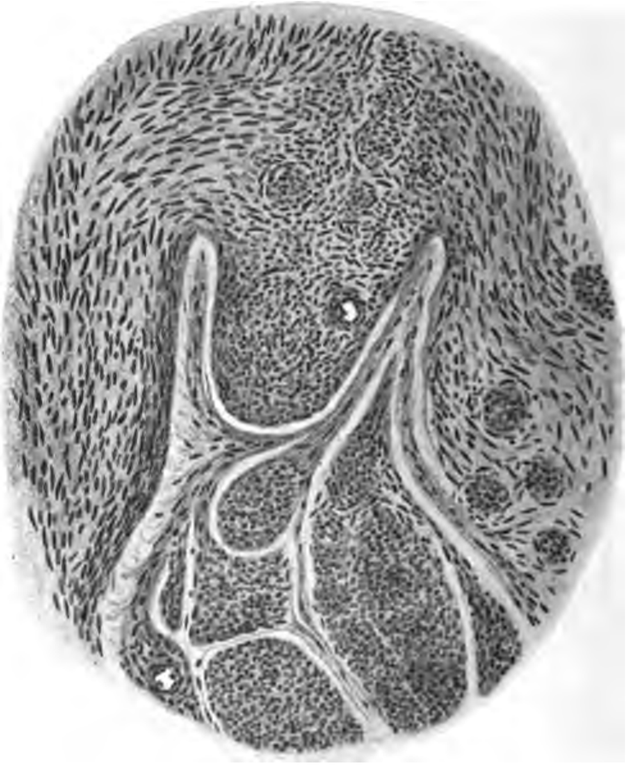

FIG. 2.—Myoma of the ovary, Case 6. Microscopic section, prepared by Mr. Shattock at the Museum of the Royal College of Surgeons of England. The plain muscle cells are seen in parts at full length, and elsewhere in section.

The Fallopian tube and the mesosalpinx, as may be seen from the drawing, were quite normal, hence there had been no perimetritis nor salpingitis, and neither tumour involved the broad ligament. The place of the ovary was occupied by an almost unilocular cyst, 2½ in. in long diameter, and 1¾ in short diameter. The ovarian fimbria of the tube (*ov. fim.*) ended on the surface of the cyst, just as it naturally ends on the ovary. The ovarian ligament (*ov. lig.*) ran into the lowest and innermost part of the cyst, at the point of junction with the second and solid tumour, the two tumours touching over a circular area $\frac{7}{8}$ in. in diameter, no pedicle separating them. The drawing shows these appearances very well.

The lower tumour was a heavy, solid body 3 in. in long diameter, $1\frac{3}{4}$ in. in short diameter, and $1\frac{1}{4}$ in. thick. It was very irregular in form and tuberous, like a small potato. It was composed of a capsule of vascular reddish brown tissue, and interiorly of a very tough mass of fibrous structures, arranged in oval and spherical nodules like balls of worsted. This arrangement, so common in interstitial uterus myomata, is not seen in ovarian fibroma. Microscopic sections of one of these nodules were made at the museum of the Royal College of Surgeons. As may be seen from the drawing (Fig. 2), the substance consisted of almost pure plain muscle cells, arranged in an irregular manner. In short, the tumour was a myoma, histologically identical with the common uterine "fibroid."

Thus, in this case, there was some doubt as to whether the pelvic swelling was an inflamed ovary or a solid ovarian tumour. It proved to be the latter, and, what is more, a rare disease, true myoma of the ovary. Clinical evidence of this form of new growth is much to be desired. At present there seems to be no means of diagnosing myoma from fibroma of the ovary. The former is much too rare a disease to be ranked as yet as more than a pathological curiosity; but, as has been the case with many other affections no longer reputed rare, it may often have been overlooked. Observers may fail to recognise plain muscle cells. Only on the high authority of Mr. Shattock do I feel certain that the tumour in my case was a pure myoma. In the case of fibroma of the ovary, we know that microscopists, working at the very same section, have disagreed as to whether cellular elements amidst the fibres represent connective tissue or sarcoma. When, however, the spread of knowledge of histology renders reports of myoma and fibroma more trustworthy, and pathological and clinical records can be safely compared, a means of diagnosis may present itself. That time, however, has not yet come. Hence comparisons are useless; thus, if we begin with the catamenial history, we find ourselves confronted by the fact that, in fibroma of the ovary, the better known of the two forms of tumour, menstruation seems not essentially affected, as I was able to show two years since,[1] Briggs of Liverpool confirming my observations a few months later.[2] Menorrhagia, when present, may be due to the tumour dragging the uterus upwards; but in this communication growths of sufficient size to drag on the uterus lie beyond the limits of discussion; moreover, the dragging has little or nothing to do with the histology of the tumour. Again, turning to myoma of the ovary, profuse menstruation, we know, is not an essential result of the development of a tumour of that kind in the uterus, as it is not observed in pedunculated subperitoneal fibroids. In my case there was slight increase in the menstrual flow, since the beginning of the illness some nine months before operation, but this might have been due to the cyst on the cervix, or to the patient's sedentary habits. Menorrhagia, from causes unconnected with the ovary, is very common; hence, as in Case 5, coincidence is always possible.

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[1] "Cases of Fibroma of the Ovary and Ovarian Ligament," *Trans. Obst. Soc. London*, 1896, vol. xxxviii. p. 187.

[2] "Fibroma of the Ovary and Ovarian Ligament," *Brit. Med. Journ.*, London, 1897, vol. i. p. 1083.

I suspect, however, that myomata are somewhat heavier than the average fibroma, which is often full of soft mucoid tissue. In my case the little tumour was already beginning to cause a feeling of weight in the pelvis. On the other hand, I have already noted that, although often hard and heavy, fibroma of the ovary causes less pain than dermoid, or any other solid or semisolid ovarian tumour, and pain was absent in five out of eight cases in Briggs' tables. Fibroma of the ovary may cause ascites, it is true; whilst uterine myoma and ovarian semisolid dermoid are seldom associated with fluid in the peritoneum. What, however, is at present to the point is the fact that an ovarian fibroma is rarely recognised till it has risen above the pelvic brim, no previous history of pain being the rule; whilst in the case of myoma under consideration there was pelvic pain, though the tumour and the small cyst above it neither rose above the pelvis nor even pressed on the uterus.

The chief peculiarity of the tumour was its position; for, though it did not spring from the ovarian ligament in any part of its course from the uterus to the ovary, it would appear from its position, as indicated in Fig. 1, that it was developed from some of the plain muscular fibres which undoubtedly exist in that ligament and run into the ovary, and grew away from its origin in the ovarian end of the ligament. It is clear from the drawing that it also grew away from the ovary, which was converted into a unilocular cyst. One result of this irregular condition was, that instead of one tumour there were two, a fact which may account for the pelvic discomfort. Pathologically, also, the tumours are quite distinct in no sense do they form a single cystic myoma.

I have already described a case of fibro-myoma of the ovarian ligament,[1] quite different from the enormous fibroma of the same ligament which I reported a few years later.[2] In 1896, Gessner[3] described another case, interesting as compared with the myoma here figured. He found a pure myoma of the size of a bean in the ovarian ligament, equidistant from the uterus and ovary. The latter organ was the seat of a fibroma. Gessner believes that a myoma of the ovarian ligament might invade a healthy ovary and convert it into a myoma of the ovary, an opinion I have always held, and justified by the condition seen in the case under consideration.

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[1] "Fibro-myoma of the Ovarian Ligament," *Trans. Path. Soc. London*, 1897, vol. xxxviii. p. 245.

[2] "Fibroma of the Ovarian Ligament, weighing over Sixteen Pounds. Removal: Recovery," *Brit. Med. Journ.*, London, 1889, vol. i. p. 1287.

[3] *Ztschr. f. Geburtsh. u. Gynäk.*, Stuttgart, 1896, Bd. xxxiv. S. 297. Pfannenstiel, in Veit's "Handbuch" (see footnotes to Case 2), once removed a fibroma of the ovary as big as a fœtal head; the ovary hung laterally from it, like an appendix. He thinks that a tumour in this position, on the median aspect of the rest of the

I will conclude with a few general considerations on these six cases. Menorrhagia and pain with pelvic swelling are the most prominent features in chronic oöphoritis. Yet profuse menstruation is by no means constant; I have found it absent in patients where the clinical symptoms and ultimate disappearance of pain and swelling proved that the disease was inflammatory, and also in patients where pyosalpinx complicated the ovarian inflammation, and an operation was ultimately necessary. In other words, neither mild nor severe oöphoritis is necessarily accompanied by menorrhagia. When that complication is present, it may be due to other causes. In my own Case 5 a cystoma was present, and there were retained fragments of placenta in the uterine cavity. I have seen precisely similar coincidences when chronic oöphoritis existed. Pregnancy may occur in the course of that disease, and uterine hæmorrhage due to traces of placenta after delivery is quite possible.[1]

Turning to small ovarian tumours, there is much greater uncertainty as to the significance of hæmorrhages. Pozzi has noted menorrhagia in cases of cysts impacted in the pelvis. It was absent in my Case 1, which was incarcerated in Douglas's pouch. Coe and Tait note the association of menorrhagia with small ovarian cysts. Davenport comments on the observations of these three observers, but admits that in his ten cases the symptom was not invariably present; I find it specified in six, and following no apparent rule. Thus menstruation was normal in his third case, where the cyst had to be enucleated, whilst it was scanty in the second, where there was a small dermoid as in my Case 2. On the other hand, evidence as to the state of the uterus is defective in Davenport's last three cases. I agree with his opinion that adhesion of an ovarian tumour to the uterus is often accompanied by menorrhagia.

In my six cases, which I have carefully selected, there was true menorrhagia in two (Nos. 3 and 5), but the symptom was traceable to a distinct cause other than ovarian enlargement. In one (No. 6) there was slight increase in the catamenial flow, but

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ovary, probably originates as a fibroma or fibro-myoma of the ovarian ligament; his case probably resembles mine. He admits that myoma of the ovary is rare, noting four cases, but remarks that there are plenty of plain muscle cells in the stroma of the adult ovary.

[1] I need hardly say that it is not always easy to distinguish menorrhagia from metrorrhagia.

this was not evidently due to the myoma which existed. In one only (No. 2) the period was absolutely regular; the tumour was a dermoid. In two (Nos. 1 and 4) it was scanty, and in one of these it must be remembered there clearly had been inflammatory changes in the ovary, so generally supposed to be indicated by menorrhagia.

Turning to pain, it will be seen that it was present in all my cases, but the cause was not uniform, as I have explained already in my observations on each case.

Thus, there is at present no special symptom nor group of symptoms by which a small ovarian tumour in the pelvis can be distinguished from an inflamed ovary. The tumour may be painful to touch, whilst a prolapsed ovary enlarged from inflammation may be almost free from tenderness. It is only careful clinical research that can offer us any chance of solving the problem. The patient must be carefully watched, and the effects of medication duly observed. When rest causes pain to diminish, whilst the pelvic swelling increases, the evidence that the ovary is cystic and not inflamed will be strong, yet, as my cases show, not conclusive.

ON THE ILLUMINATION OF THE AIR SINUSES OF THE SKULL, WITH SOME OBSERVATIONS UPON THE SURGICAL ANATOMY OF THE FRONTAL SINUSES[1]

By A. Logan Turner, M.D., F.R.C.S.Ed., *Surgeon for Diseases of the Ear and Throat, Deaconess Hospital, Edinburgh.*

(Plates XV., XVI.)

(*Concluded from page* 374.)

Frontal sinus.—For the purpose of illumination, the vulcanite plate used for the tongue is removed from the lamp, and a short tube, projecting slightly beyond the lamp, and made of india-rubber, bone, or ivory, carefully blackened, is fitted over it, so that the light is transmitted in one direction only, namely, from the open end of the funnel. Unfortunately, there is a considerable amount of heat conducted both through the covering and directly from the glass of the lamp to the skin of the person under examination, rendering any prolonged application of it impossible. Cork soon smoulders, on account of the heat, and is not serviceable. The open end of the tube is applied to the floor of the sinus, *i.e.* the roof of the orbital cavity, a short distance above, and slightly external to, the inner canthus of the eye. The application requires a certain amount of care, if the best results

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[1] A lecture delivered before the Royal College of Surgeons, Edinburgh, 25th February 1898. The methods of illumination were demonstrated, and variations in the anatomy of the frontal sinuses were illustrated by lantern slides.

are desired. The floor of the sinus is exceedingly thin over a certain area; around that area the bone is thicker, and the rays of light will penetrate through it less effectually. This thin area lies below the supra-orbital margin, and occupies mainly the inner segment of the orbital roof. As the supra-orbital notch or foramen is an anatomical landmark, subject to some variation in its position, and as the trochlear eminence is not palpable in every skull, it is not advisable to take either of these points as a guide to the correct position of the lamp. I have therefore measured the distance of the inner margin of the thin area of bone from the middle line of the nose at its root, and in the cases measured the average distance from the middle line was found to be 17 mm., or rather more than half an inch. The inner edge of the lamp, therefore, should not be placed nearer the middle line than this, if it be desired to obtain the full benefit of this thin plate of bone, the average thickness of which is less than 1 mm., and readily transmits light. Further, the lamp must be placed well under the supra-orbital bony margin, otherwise some of the rays of light tend to pass through the superficial soft tissues upon the forehead, lighting them up, and so deceiving the observer as to the true condition of the deeper bony parts. When the end of the lamp is applied to the area of bone just described, it has a direction inwards, backwards, and upwards. The patient should be directed to turn the eyeball downwards, and thus a little more space is obtained; the pressure of the lamp should be firm but gentle. The result of illumination is to be observed first upon one side and then upon the other, and a comparison is to be made between the two, the method thus differing from that employed in examining the maxillary antrum, where the cavities in both jaws are illuminated simultaneously. The intensity of the light and its area of distribution must be noted, and, if possible, the position of the septum defined. Such is the method of examination. Can we accurately define the limits of a sinus, and what practical results may be obtained from it? It was pointed out by Kuhnt,[1] in his admirable monograph upon inflammatory affections of the frontal sinuses, that these cavities could be defined by illumination. I have had exceptional opportunities of proving the accuracy of this statement, by first illuminating and then opening a large number of frontal sinuses. In all, forty-three sinuses in adult *crania* were illuminated, and the area thus defined was mapped out upon the bone; the cavities were then opened into by complete removal of their anterior wall, and the true size of the cavity was compared with the area previously defined (Plate XIV., Figs. 1 and 2). In this way many interesting observations have been made, and the results may be given in some detail.

Twenty-two sinuses were found to be accurately illuminated. Two gave a negative result to illumination, because no sinus was present. Five gave a negative result to illumination, although a sinus was found to exist in each case. Thirteen sinuses were somewhat larger than the illumination suggested. One sinus was smaller than the area defined by illumination. In no case did illumination suggest the presence of a sinus which did not exist.

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[1] "Ueber die entzündlichen Erkrankungen der Stirnhöhlen," Wiesbaden, 1895.

When the frontal sinus is accurately delineated upon the skull, a very pretty demonstration is given of its dimensions; the septum is distinctly defined, lying mesially or obliquely, and the wavy outline of the sinus, with or without the indication of small and incomplete partitions, may be followed from the upper end of the septum downwards and outwards to its termination at the supra-orbital margin. The whole anterior wall may be illuminated with the same intensity, or parts thicker or denser than the rest may be depicted with less brilliancy, the superciliary ridge being frequently defined from the surrounding bone in this way by a shaded area. If the bone is thin, the rays passing through the intervening septum may illuminate the opposite cavity more or less accurately, with an intensity which is considerably less than that seen over the cavity primarily illuminated. It will be evident from the figures above quoted that every frontal sinus does not light up in the way described. The sinus may altogether fail to illuminate, as in five instances, or there may merely be sufficient light transmitted to indicate that the bone is not solid, but that a cavity of some kind is present; or a part of the sinus only may illuminate with accurate definition, the rest failing to do so, thus giving a wrong impression of its true size, as in the thirteen instances above quoted.

There are several reasons for incomplete illumination of the sinuses, or for their complete failure to light up. The commonest cause of failure of illumination is to be found in the thickness and density of the bone forming the anterior wall of the sinus. The orbital roof or floor of the cavity through which the rays must first pass need hardly be dealt with in this connection, as, with two exceptions out of seventy-eight examined, the bone in the area already described was less than 1 mm. in thickness, and transmitted the light through it. In the anterior wall, however, differences were found, the thickness of the bone varying from less than 1 mm. to as much as 6, 7, and 8 mm. An endeavour was made to ascertain the thickness beyond which light failed to penetrate the bone, but this could not be definitely estimated, because it was found that the density of the osseous structure formed a very important obstacle to the transmission of light. Bone which was porous and soft, though actually thicker when measured, was found to transmit light more readily and with greater intensity than thinner and denser bone; the brilliancy of illumination may vary in different parts of the same sinus, owing to these changes in thickness and density in different areas.

If the figures that have been obtained by measurement be studied more closely, it is found that, as a rule, bone which is 3 mm. or less in thickness illuminates brightly, though exceptions to this are met with, as, for example, in one case where bone only 2 and 3 mm. thick failed to transmit any light, owing to its density. Again, where the bone measured 4 mm. and more, the rule was to find that no illumination took place, though four or five exceptions occurred, in which, from the porosity of bone, 5 and 6 mm. thick, a shaded area of illumination was mapped out on the skull.

In two instances the sinus did not light up at all, because the rays from the lamp, instead of passing through the floor of the cavity, fell behind it, and did not enter the space at all. The anatomical reason for this was to be found in the close approximation of the anterior and posterior walls of the sinus at the orbital roof, just below the supra-orbital margin. As a result of this there was almost complete absence of a true floor, and the upper margin of the lamp, as it lay in position, was in reality behind the sinus. Lastly, the absence of a sinus altogether must be referred to in connection with negative illumination. The sinus was absent on one side in two instances out of thirty-seven adult crania that were opened; in no case was bilateral absence met with. In one case, as already mentioned, the sinus was slightly smaller than the area illuminated; this was due to the great porosity of the bone immediately beyond the limit of the sinus, the diploë between the two tables of the frontal bone being very large, so that little opposition was offered to the further passage of the rays of light.

In order to increase the clinical value of transillumination of the frontal sinuses, it is necessary to ascertain, for the purpose of comparing a possibly diseased sinus with its healthy neighbour, whether the two sinuses, as a rule, illuminate equally. In the examination of the maxillary antrum in the skull, it was found that a considerable number illuminated equally, while a certain proportion showed inequality. In the case of the frontal sinuses some inequality in the brightness of the illumination on the two sides is not infrequently observed; the degree is slight in a large number of cases, nevertheless it exists; and in healthy living persons also, the same observation is frequently made.

Having proved the value of this method of research by subsequently opening the sinuses in the above series of skulls, I proceeded to illuminate a large number of frontal sinuses in various races of both sexes, partly to test the illuminating capabilities of the different races, and partly with the view of ascertaining whether any racial characteristics could be differentiated. My investigations in this direction need not be detailed here, but will be reserved for future publication elsewhere. They have been carried out upon the skulls of Esquimaux, Chinamen, Maoris, Bushmen, Burmese, Germans, Russians, and Frenchmen.

Before illumination of living persons can be estimated at its proper value, it is necessary to see if the soft parts covering the bones have any influence upon the transmission of light. For this purpose I found the examination of *cadavera* useful. The sinuses were first illuminated in the ordinary way, and mapped out upon the skin by means of nails which penetrated the periosteum and bone beneath; the scalp was then reflected downwards over the supra-orbital margins, far enough to allow of the lamp being placed against the bone forming the floor of the sinus; while this was being done, the line already drawn on the skin was defined upon the bone. The bare bones were next illuminated, and the result again mapped out. The sinuses were then opened, and the results of illumination compared. Though these observations were limited in number, they proved that the cavity could be accurately defined by illumination through the soft parts; and the chief effect that the soft tissues appeared to have in these experiments was to diminish the intensity of the light. A more brilliant area, though not a more extensive one, was obtained when the illumination was made upon the bones only. While working out this, a striking illustration was afforded of the possibility of obtaining a false impression of the true state of affairs. In one cadaver both frontal sinuses appeared to be illuminated, but on opening the skull both were found absent. This was brought about by insufficient care in the placing of the lamp, so that the light passed through the soft tissues round the supra-orbital margin, and possibly through the edge of the bone, and thus illuminated the lower part of the forehead.

Illumination of the frontal sinuses can be satisfactorily demonstrated, with such limitations as have already been discussed: *in healthy living persons* they can be very beautifully mapped out in the majority of cases; an analysis of a large number of observations bears this out. Many persons were examined, and the appearances carefully noted. In one, illumination was negative upon both sides; in another, it was absent on one side only. It was, of course, impossible to say whether a cavity existed in these instances or not, nothing in the external configuration of the forehead suggesting one thing or the other. With these exceptions both sinuses illuminated; in many of them no difference could be detected between the intensity of the two sides; in others, again, slight variations in degree were obvious, though this was certainly not noticed so frequently as in the dried skulls. In a few cases both sinuses were illuminated from one side, the sinus on the same side as the lamp being more brightly defined than that of the opposite side, the position of the septum being indicated at the line of junction between the bright and shaded areas. I think it is probable that in almost every case both sinuses are illuminated from one side, but it is only in those whose bones are thin or are not of a dense consistence that the darker illumination of the opposite side becomes visible to the observer's eye.

Variations in the intensity in different areas of the same sinus may be noticed; the superciliary ridges may be mapped out in shadow, and here and there the semblance of a ridge or spur of bone jutting into the cavity may be suggested by a darker line. The septum intervening between the two cavities was defined as mesial in position in by far the larger number of cases, and usually the sinuses appeared to be of equal extent upon the two sides, though occasionally a distinct difference in their relative size could be seen. The equality was probably more apparent than real, as we have never found in skulls, by measurements, two perfectly symmetrical sinuses. When one side is illuminated, and then the other, and the bright areas are not mapped out on the skin with lines, unless there is some considerable variation in the relative size of the two sides, the difference is less likely to be detected. There is no doubt that a class of case occasionally presents itself, in which it is extremely difficult to say whether the narrow zone of illumination seen above the supra-orbital margin results from the rays penetrating a cavity in the bone, or whether they have merely passed through the thin marginal edge of bone and superjacent soft parts. The narrow even zone of light confined to the region of the eyebrows, and giving no sense of depth, renders this view a very probable one in a few cases. In conclusion, I would only add that in my experience illumination of the frontal sinuses in healthy living persons differs only from that in the dried skulls, in the diminished brilliancy of the transmitted light, and in the absence of so much detail.

I have worked at a suggestion thrown out by Dr. M'Bride, that the lamp might be placed upon the anterior wall of each sinus, and the result noted, as it appeared to me that this might prove of some supplementary value in the examination of frontal sinuses by transillumination. If the person be asked to close the eyes, and the lamp, protected with its tube, be placed upon the lower part of the forehead over the region of the sinus, and on one side of the middle line, a subjective sensation of light is perceived in the eye upon the same side. Care must be taken that the reflection does not pass through the soft tissues around the supra-orbital margin, a source of fallacy which must be avoided. The lamp is then placed in a corresponding position upon the other side, and a similar result is noted. The sinuses are next illuminated in the ordinary way from below. I have observed that, as a rule, the individual under examination described the subjective sensation of light as of equal intensity on the two sides, when both cavities were illuminated equally from below; again, that he described, as a rule, the subjective sensation to be greater on the side upon which the cavity was observed to light up more brightly; and in one case where he perceived no light sensation, illumination of the cavity on that side was negative. Such results are only to be expected as the rays are passing through the same structures, but in opposite directions. By this additional test, however, we have the examination of the frontal sinuses brought into similar conditions with that of the antrum, in the fact that the observation of the person examined is checked by that of the examiner, and *vice versâ*.

With these anatomical facts, and this experience before us, we naturally ask ourselves if transillumination of the frontal sinuses is of any value to the surgeon in the diagnosis or treatment of *disease*. Two conditions may be met with in suppuration of a frontal sinus. The pus either collects in the cavity from swelling of the mucous membrane of the duct of exit, or from the presence of granulations around it, and this may be associated with general thickening of the lining membrane of the cavity; or the pus may be constantly draining away, on account of the natural opening of the sinus being as a rule in the lowest part of the sinus. In this fact we have an important anatomical difference between the frontal sinus and maxillary antrum. If the pus collects, or if the cavity contains granulation tissue, or even polypi, no illumination of the diseased sinus may be possible, just as we have seen in a case of empyema of the antrum of Highmore; under such circumstances, therefore, we would be able to contrast the darkness on the one side with the illuminated area on the other, provided, of course, that the opposite sinus be healthy. Taking this negative illumination into consideration along with other diagnostic signs, both positive and negative, we would have additional evidence to enable us to arrive at a correct diagnosis. Unfortunately, however, a sinus containing pus, and with a lining of granulation tissue, may illuminate, even though such illumination be of less brilliancy than upon the opposite healthy side. The frequency with which inequality in the intensity of the light on the two sides is met with in healthy persons would considerably detract from the diagnostic value of this observation in these cases. Again, in a certain number of cases, suppuration is present on both sides, and thus any comparison is rendered impossible.

If a suspected cavity should be examined, at a time when the pus is constantly draining from it, or when the disease is of comparatively recent date, and the lining membrane has not yet undergone the change just described, illumination of the cavity may be good, and differ but little, if at all, from that of the opposite sinus, and hence nothing is gained by comparison. In a case recently under the care of Dr. M'Bride, the right frontal sinus, containing pus and granulation tissue, illuminated, though with less intensity than the left one. I had also an opportunity of illuminating this patient four months before the second examination, and at that time noted that both sinuses illuminated equally. In such an exceptional case this method proved undoubtedly useful. As this patient was only 13 years of age, the evidence, before operation, of the presence of a well-developed sinus was of special value. It will be evident, therefore, that from the point of view of diagnosis, transillumination of the frontal sinuses is of comparatively little value. Dr. Milligan, in an interesting paper[1] on frontal empyema, based upon a large experience, states that he has not found it yield reliable results, and other observers have had similar experience.

From the point of view of treatment, however, transillumination of the frontal region may prove of more service. If, in the first instance, those cases of suppuration which do illuminate are considered, it is possible to define the limits of the sinus both vertically and horizontally, at the same time mapping out the position of the septum and its relation to the middle line. In this way the surgeon may be guided in the choice of his operation, and it will help him to apply the trephine saw or the chisel to the bone within the area of the sinus and not beyond it, a mistake which might readily be made if the sinus were small, and due care not exercised. If the sinus thus indicated were a large one, he might prefer to remove the floor of the cavity rather than the anterior wall, and thus avoid the risks of considerable disfigurement of the patient.

If, however, the diseased sinus should prove negative to the transmission of the rays, the method may still have a useful application. The sinus on the opposite side may illuminate, and in this way the position of the septum may be defined, a point of no small value when we remember the considerable variations met with in the position of this partition.

I had the opportunity of making an interesting observation while examining a case of double frontal empyema, under Professor Annandale's care Both sinuses were negative to illumination, but when the lamp was gradually carried outwards below the supra-orbital margins, a point was reached where illumination of a limited area immediately above the eyebrow occurred. This evidently took place through the somewhat thin bone forming the supra-orbital edge externally. The junction of light and darkness was probably the external limit of the diseased sinus. This was observed on both sides. In this case the observation appeared to be correct, so far as could be gauged by measurement with the probe.

An examination of a few adult skulls, in which no sinus existed, showed the same phenomenon. The thick bone which lay near the middle line of the forehead did not illuminate, while external to that the thinner bone forming the supra-orbital margin in the outer segment of the orbit lit up. As a further experiment, I illuminated a sinus in a skull, and defined it. I then stuffed the cavity sufficiently to render it impervious to the rays, and again illuminated; the thin bone external to the sinus alone lit up, and the point at which this commenced corresponded to the outer limit of the sinus previously defined.

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[1] *Lancet*, London, February 19, 1898.

If we have to deal with unilateral frontal empyema in a cavity which fails to illuminate, while that on the opposite side transmits the rays, we may therefore define both the internal septal limit and the external extent of the diseased sinus. If the disease is bilateral, and illumination is negative on both sides, we may define horizontally the limits of the disease. These are points of considerable value to the surgeon, as the extent of the sinus may guide him in the choice of his operation.

During recent years considerable advance has been made in the surgery of the frontal sinuses; and the improvements which have been advocated and carried out in the technique of extra-nasal operations has led to greater success in the ultimate results that have been obtained. Side by side with such successful results, cases are still met with in which the healing process is much protracted, and in which second operations may prove necessary before the cure is obtained. The presence of granulations and polypi, associated ethmoid disease, and imperfect drainage through the nose, are factors which require to be radically dealt with before ultimate success is obtained. But certain anatomical reasons appear to exist and increase the difficulties of treatment, and due regard must be paid to the many variations that may be met with in the anatomy of the frontal sinuses, in order that operative interference may be as thorough as possible.

The more recent observations of Zuckerkandl,[1] Kuhnt,[2] and Tilley[3] in this field have added to our knowledge of this region. I wish to lay before you some of the observations which I have made from a careful study of seventy open sinuses in macerated skulls. Without wearying you with anatomical detail, however interesting it might prove to be, I shall merely illustrate some of the more striking features observed. In none of the adult crania which were opened were both sinuses absent, though, in the large number that were subjected to illumination only, evidence of the presence of both was not obtained. In two of the skulls opened, a sinus was found absent; in one case on the right side, in another upon the left. Some reference must be made to the fact that prominent superciliary ridges do not necessarily indicate the existence of large sinuses behind them. It is true that very large sinuses may be found in association with a massive brow, and it would be only natural to conclude that a considerable cavity existed in individuals thus marked; nevertheless, sinuses of comparatively small dimensions have been found in such cases. The largest pair of sinuses met with in this series lay behind very massive and prominent superciliary ridges. In another skull, however, where the superciliary ridges were strikingly prominent, a comparatively small sinus was found upon the right side, the prominence of the ridge being largely formed by solid bone. On the other hand, large sinuses are met with where the superciliary ridges are faintly marked, and where the forehead is low; an instance of this may be cited in a skull where both the cavities measured very considerably more in all directions than the average obtained in the series.

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[1] "Norm. u. pathol. Anat. d. Nasenhöhle u. ihr. pneumat.," Anhänge.

[2] *Op. cit.*

[3] *Lancet*, London, Sept. 26, 1897.

Variations in the size of the cavities.—Great variations are met with in the size of these sinuses, not only in different skulls, but on the two sides of the same skull. Each sinus has been measured in three diameters—vertical height, horizontal breadth, and antero-posterior depth; and, taking the average of these three diameters, it has been found that in this series of adult crania a sinus giving the following measurements might be considered as one of average size:—Height, 31 mm., *i.e.* from the fronto-nasal aperture vertically upwards; breadth, 30 mm., *i.e.* from the septum horizontally outwards; depth, 17 mm., *i.e.* from the anterior wall at level of fronto-nasal suture backwards along the orbital roof. As extremes, we find that the smallest sinus extended outwards to the junction of the inner and middle thirds of the supra-orbital margin, and measured in height, 19 mm.; breadth, 14 mm.; depth, 5 mm. (Plate XV., Fig. 3). In this skull the two sinuses together formed an almost symmetrical pair. The largest, on the other hand, bounded internally by a mesial septum, was limited externally by the bony wall of the temporal fossa, while it extended along the roof of the orbital cavity as far as the anterior edge of the optic foramen, and had the following diameters:—Height, 45 mm.; breadth, 60 mm.; depth, 47 mm. (Plate XV., Fig. 4). It is necessary, however, to note that the greatest vertical diameter was not found in the largest sinus, the highest cavity met with measuring 53 mm., thus extending upwards upon the forehead more than 2 in. (Plate XV., Fig. 5).

In determining the depth of a sinus, it must be understood that a considerable difference exists as a rule between the depth of the sinus behind the superciliary ridge and its maximum depth along the floor of the cavity. In some cases it is true that very little difference exists between these two measurements, but in a large number of cases this is not so. In the upper part of the cavity, behind the superciliary ridges, the distance between the anterior and posterior walls may be 5, 6, 7 or even 8 mm.; while we have already seen that the average depth of the sinus in this series is 17 mm., *i.e.* more than half an inch, while many considerably exceed this measurement. In dealing with these cavities surgically, this backward extension of the floor must not be lost sight of, if the necessity for curetting the lining membrane exists. In Jansen's operation, for opening the sinus by removal of the bony floor of the cavity, freer access can be obtained to this region, and the parts can thus be more thoroughly dealt with (Plate XVI., Fig. 12).

Perfectly symmetrical sinuses in all directions were never met with when the measurements were carefully studied. Mere inspection of a pair sometimes suggested absolute symmetry, but more careful examination revealed one or more differences. As would naturally be expected in these cases, where the septum was placed mesially, the greatest approach to symmetry was found. Sometimes the right, sometimes the left sinus, was found to be the larger, but the right was more frequently the smaller of the two.

The septum.—In all the skulls examined, with one exception only, a complete bony septum was found. In this case the upper part of the septum, which was oblique to the right, was well formed, but towards the nose it was deficient, a bridge of bone alone connecting the upper part with the root of the nose. The right sinus drained into the left nostril through the gap below this bridge. Nothing in the appearance of the parts suggested that any destruction had occurred as the result of disease. The bony septum is as a rule very thin, and it is conceivable that perforation may take place, and purulent infection of the other cavity follow. This is not a constant result, as has been proved by finding suppuration confined to one sinus, even in old-standing cases of disease. In the majority of the cases the septum was mesial in position; and, even in some of those in which obliquity was found, it occupied at first a mesial position, immediately above the root of the nose. In one instance, the septum crossed the middle plane of the frontal bone, arising at its lower end on the right side and crossing so as to occupy above an oblique position to the left (Plate XV., Fig. 6). In four instances, though mesial above and below, the septum was bowed to one or other side of the middle line. The question of obliquity of the septum is not without practical interest to the surgeon. Its deviation to one or other side may be of such a nature as to render him liable to make a mistake as to the exact condition present. In the first place, having opened the anterior wall of the sinus in which he suspected the presence of pus, he may find that a probe may readily pass both to the right and to the left for a considerable distance. He might very naturally suppose from this that the two sinuses communicated and that suppuration existed in both of them, the fact being, however, that, owing to the great obliquity of the septum, the sinus which was opened extended very considerably to the opposite side of the mesial plane (Plate XVI., Fig. 7). In three instances this anatomical condition existed in a strikingly marked degree. Again in two of these cases the septum lay so close to the supra-orbital margin of one side, reducing one sinus almost to a slit, that it would have been extremely difficult, if not impossible, for the surgeon to realise that a second cavity existed there (Plate XVI., Fig. 8). It would be probable, therefore, that with suppuration in the smaller sinus the larger healthy sinus would be opened into, if the chisel were applied to the anterior wall, thus giving rise to a misconception in diagnosis and to a mistake in treatment. Suppuration might have occurred in both of these small cavities, as each communicated with the nose through a fronto-nasal aperture. It is in cavities such as these that illumination of the healthy sinus might map out the oblique position of the septum, and thus afford valuable aid to the surgeon. Opening of the suspected sinus through the orbital roof, as carried out by Jansen, would prevent the wrong cavity being opened into.

The examination of the interior of a number of frontal sinuses soon discloses the fact that these cavities in many cases are something more than simple chambers. Imperfect partitions, perhaps more happily expressed as piers varying in length, may jut out into the cavity at intervals, and so produce recesses or bays. In two instances, an attempt at the formation of a second but incomplete septum close to the middle line was observed lying parallel to the true septum, and giving rise to a well-marked recess in that region. Usually these irregularities are found to exist towards the external angle of the sinus; and in all cases of disease, when the cavity has been opened, special attention should be directed to this region, with the view of detecting recesses and pockets, and dealing with their contents. It may be necessary to break down partitions, in order to allow of the thorough removal of granulations and to admit of free drainage. These partitions may be developed to such an extent that the sinus may be divided completely, or in part into two, an outer and an inner cavity. In one instance, where no right sinus was present, the left was divided into two by a complete vertical bony septum, each division having an ostium below, which opened into a common fronto-nasal passage (Plate XVI., Fig. 9). The appearance here suggested the development of a double sinus upon the left side, as a substitute for the absent right one. In another instance, where both the sinuses were well developed, a similar condition to that just described was present in the right sinus (Plate XVI., Fig. 10).

Such accessory septa are not only developed vertically, but they are also found horizontally, so that an incomplete and even a complete upper and lower cavity may exist in the one sinus (Plate XVI., Fig. 11, and Plate XV., Fig. 4). Some very pretty examples of this anatomical development were met with, in which both cavities communicated with the nose. It will be at once evident from these observations that in a considerable number of cases irregularities exist, necessitating a careful search on the part of the surgeon, in order that the whole sinus may be thoroughly dealt with and every possible focus of suppuration removed.

Before leaving this subject, a few words must be said as to the position and the patency of the fronto-nasal aperture. Considerable variation is met with in the relation of this orifice to the anterior wall of the sinus. If the fronto-nasal suture be taken approximately as the lower limit of the anterior wall, it is found that the depth of the aperture below this line varies very much;

it may lie practically upon the same level as the suture, or it may be as much as 20 mm. below it, *i.e.* more than half an inch. This relation, however, is not of so much practical importance as the position which the aperture occupies in the floor of the sinus. It may lie anteriorly, almost directly below the anterior wall; or it may be situated posteriorly, closely related to the posterior wall of the sinus; while in other cases, again, it occupies an intermediate position. Free drainage into the nose is most essential in dealing with abscess in this region. In passing a probe or forceps downwards into the nose, for the purpose of inserting a drainage tube, considerable variation in the shape of the curve is necessary, in order to find the natural opening. The size of the aperture also varies; the average diameters obtained in a large series of measurements were 4¼ × 3¼ mm., but the opening varied from a mere slit, which would not admit the point of a fine probe, to one measuring 7 × 8 mm. Blocking of the passage and the consequent retention of pus becomes more easy in one case than in another, and the symptoms of frontal sinus suppuration would be influenced to some extent by the anatomical condition present. So close is the anatomical relationship between the floor of the sinus and the anterior ethmoidal cells, that the one cavity might be described as contiguous with the other, while the fronto-nasal duct passes through these cells (Plate XVI., Fig. 12). In those skulls in which the sinus was divided by a horizontal partition into an upper and lower cavity, the latter appeared to be formed as a distinct expansion of the anterior ethmoidal cells, immediately behind the infundibulum. Ethmoid suppuration associated with frontal empyema is readily understood. Milligan[1] found its coexistence in nine out of fifteen cases, Jansen[2] in eight cases operated upon. Breaking down these cells in the floor of the sinus with a sharp spoon is therefore strongly indicated, not only for the purpose of establishing free drainage from the frontal but for liberating the pus from the ethmoid cells.

The mastoid cells.—In order to complete the subject of cranial sinus illumination, it is necessary to refer to its application to the mastoid cells as suggested by Heryng, and worked at later by Caldwell. Observations which I have carried out, both upon skulls and upon living persons, have hardly met with sufficient success to suggest its use as a method of any clinical value. It may be practised, either by the introduction of a small lamp into the external auditory meatus, where that is possible, and the effect produced observed on the outer surface of the mastoid process; or by the application of the lamp to the mastoid behind the pinna, while a speculum is introduced into the meatus and the result noted. In the former case the meatus does not admit more than a two-candle power lamp, while a five-candle lamp may be applied externally to the mastoid.

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[1] *Op. cit.*

[2] *Arch. f. Laryngol. u. Rhinol.*, Berlin, 1893, Bd. i. Heft 2.

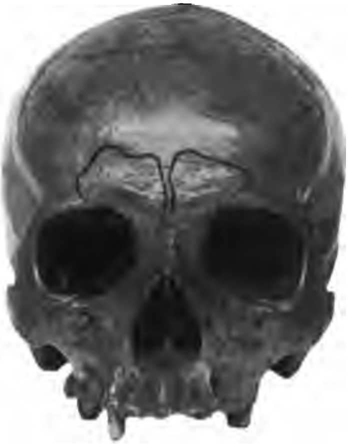


Fig. 1.

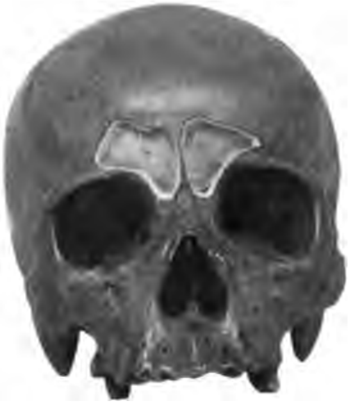


Fig. 2.

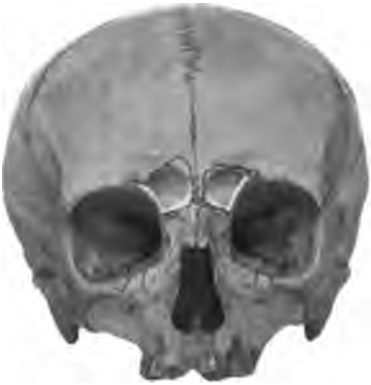


Fig. 3.

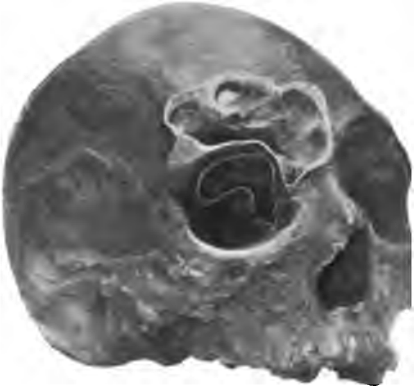


Fig. 4.

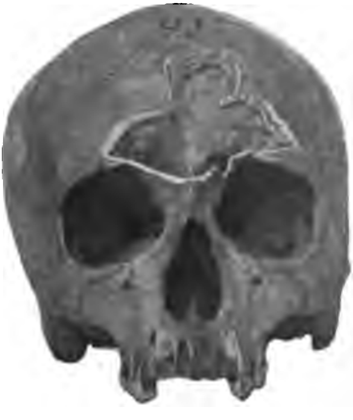


Fig. 5

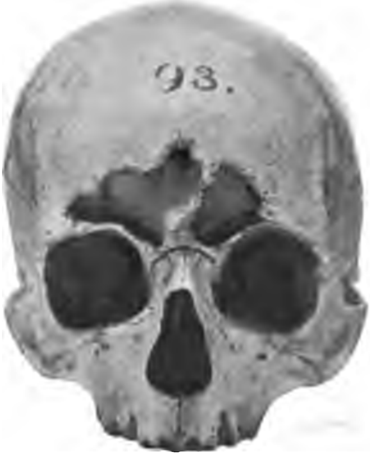


Fig. 6.

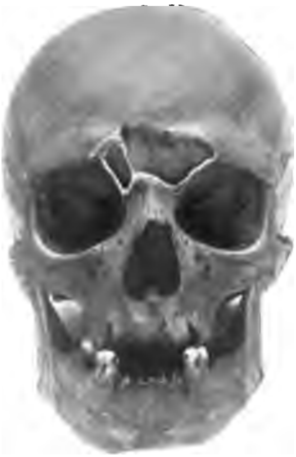


Fig. 7.

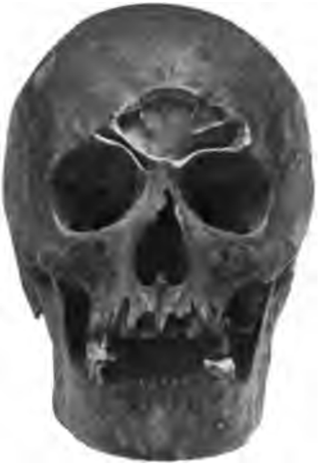


Fig. 8.

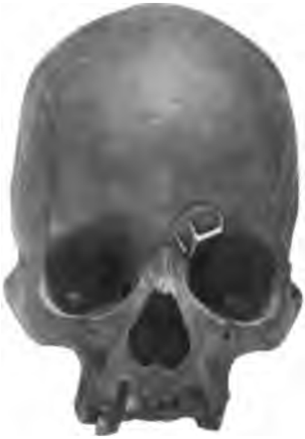


Fig. 9.

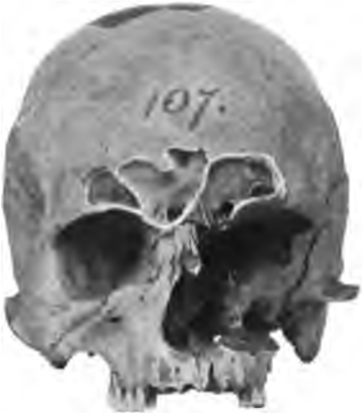
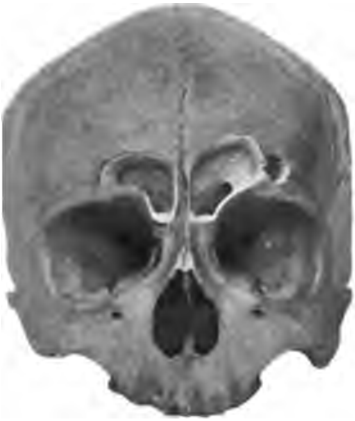
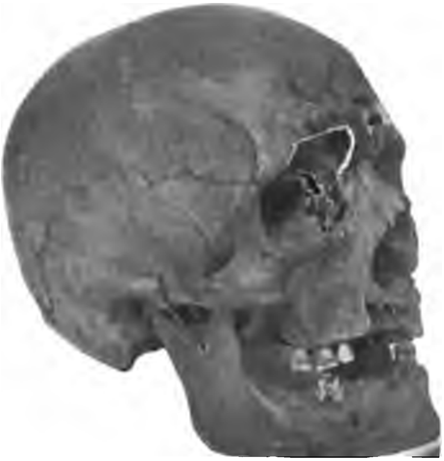


Fig. 10.





In both cases there must be complete darkness, so that the illumination of the cells may be carefully observed. The object of the experiment is to determine, by the absence of illumination, the presence of pus in the mastoid cells, in cases of middle-ear suppuration. It is at once evident that the possibility of sclerosis of the bone in association with repeated attacks of mastoiditis, or with a long-continued middle-ear suppuration, would at once nullify the test. But the examination of skulls, of which, it is true, no previous history was obtainable, and of healthy living persons, gave very unsatisfactory results. The application of the more powerful lamp to the mastoid was found more serviceable, as the weaker one in the auditory meatus was found of little or no value. Of twenty-four skulls examined by the former method, sixteen failed completely to illuminate on either side, six illuminated feebly, while in two only could it be said that a fairly good illumination of the meatus was obtained. In none of them, however, did the lamp succeed in lighting up more than the most superficial of the mastoid cells; in other words, only those cells that lie on a plane external to the outer end of the osseous meatus were lit up. No light could be detected in the deeper parts of the meatus, or in the middle ear, and thus the antrum and the deeper mastoid cells failed to illuminate in every case. Observations upon a number of living persons gave very similar results, and did not prove satisfactory.

In conclusion, I wish to express my thanks to Sir William Turner, to Dr. M'Bride, to Mr. Cathcart, and to Dr. Harvey Littlejohn, for the valuable material which they kindly put at my disposal for this investigation; and further to thank Mr. James Simpson for his kind assistance, so frequently given to me.

RHEUMATIC AFFECTIONS OF THE HEART IN CHILDHOOD AND EARLY ADOLESCENCE.

By John F. H. Broadbent, M.D. (Oxon.), M.R.C.P.

Rheumatism in adults attacks the joints and gives rise to marked constitutional disturbance. The joints are swollen, tender, and painful when moved; there is fever and anorexia; the tongue is coated; and the body is bathed in profuse perspiration, with a characteristic sour smell. So acute are the symptoms that the patient is compelled to take to his bed without delay, but alarming as they appear at the outset they usually yield rapidly to suitable treatment, and the heart in the majority of cases escapes damage.

In childhood and early adolescence, on the other hand, as originally pointed out by Dr. Cheadle,[1] the articular manifestations of rheumatism are, as a rule, slight, and may be confined to fugitive pains or stiffness in the joints or limbs; there may be little or no constitutional disturbance, so that the patient, after a day or two indoors, goes about again as usual. In spite of this absence of any marked symptoms, the rheumatic poison may all the time be attacking the heart, and setting up endocarditis, pericarditis, or myocarditis in conjunction with one or both of the former.

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[1] Harveian Lectures, *Lancet*, London, 1889.

In the rheumatism of childhood the heart comparatively rarely escapes, and, owing to the insidious nature of the inflammatory process, irreparable damage may be done before the severity of the cardiac symptoms compels the patient to seek medical advice, or take to his bed. To give an illustration of a case in point. Patrick D., æt. 14, employed at one of the large shops in London, walked up to the out-patient department at St. Mary's Hospital on 2nd January 1897. He stated that he had vomited the previous day after having some pork for dinner, and complained of being rather short of breath. It was noticed that he was somewhat cyanosed, and was breathing rapidly, and the pulse rate was 132. On examining his chest, well-marked pulsation in the epigastrium, and in the third, fourth, and fifth left intercostal spaces, was noted. The apex beat was diffuse, and was visible in the fifth left space, just outside the vertical nipple line. The area of cardiac dulness was enlarged and extended to the right, half an inch beyond the right border of the sternum; to the left, just beyond the vertical nipple line; and above, to the third space. At the apex a loud blowing systolic murmur was heard, conducted into the axilla, and at the base, over the aortic area, a soft diastolic murmur conducted down the sternum. There was no marked throbbing of the carotids, the pulse was not collapsing in character, and a distinct aortic second sound was audible at the base as well as the diastolic murmur; the pulmonic second sound was accentuated. The liver was somewhat enlarged, but there was no œdema of the extremities. Rheumatic nodules were present on the elbows and knees.

The history given by the boy was, that two months ago he had felt some stiffness in the knees, and had remained at home two days. He soon felt all right again, and up to the day on which he came up to the hospital he had been at work as usual. He was at once admitted, but got rapidly worse, suffering from great dyspnœa, and repeated attacks of vomiting; the diastolic murmur became more pronounced, and the pulse collapsing in character; the cardiac dilatation increased; the liver became more and more enlarged, and œdema of the lower extremities set in, and soon became extreme. He died on 17th February, six and a half weeks from the date of his admission.

The stiffness in the knees, two months before he came up to the hospital, seems to have been the only warning of the attack of rheumatism which gave rise to such serious cardiac mischief; and so slight were the symptoms, that the boy was undoubtedly going about his work with active endocarditis for some time, probably two months, before he sought medical advice, and by that time the heart had become dilated to an extreme degree. This case illustrates the insidious form that the rheumatism of early adolescence or childhood may assume, and shows how much damage may be done to the heart before any serious symptoms compel the patient to give in.

From this also it will be seen that endocarditis may for some time give rise to no symptoms to announce its presence, and the only physical sign by which on examination, we can with certainty diagnose its existence, is the development of a valvular murmur, or of some change in the character of an already existing murmur. Usually, when we thus discover this, we also find evidence of cardiac dilatation; and it is probable that in most cases this precedes the development of a murmur, as the inflammatory process must be active for some little time before the valve attacked is sufficiently damaged to become incompetent, and possibly the murmur first heard is often the result of dilatation alone. It has been said that alterations in the pitch and character, or a muffling of the first sound heard at the apex, may be a premonitory indication of endocarditis anticipating the murmur; frequently, some such change or a reduplication of the first sound may be observed, but there is no characteristic modification on which reliance can be placed for diagnostic purposes. The early diagnosis of endocarditis, therefore, though of great importance, presents considerable difficulty. Pericarditis frequently follows close on the heels of endocarditis; and, according to Dr. Sturges, it is exceptional for the victim of endocarditis to escape pericarditis. Repeated attacks of cardiac inflammation are liable to occur in the rheumatic child, in one of which, if not in the first, pericarditis will in all probability be set up. The first definite indication of the onset of pericarditis is a to-and-fro friction rub, first audible, as a rule, at the base of the heart over the left auricle, less commonly at the apex. Various warning symptoms may precede the appearance of the friction rub, such as acceleration of the pulse, dyspnœa, restlessness, rise of temperature, increase in the area of cardiac dulness, and occasionally some irregularity of the cardiac action.

In watching the progress of a case of pericarditis, one of the most striking features to be noted is the rapid increase in the area of cardiac dulness, to which attention has been drawn by Dr. Lees, which takes place even though the patient is kept in bed and carefully nursed and treated, whether by ice-bags, leeching, or blisters applied on the præcordial area. This rapid increase in the area of cardiac dulness is due, as a rule, not to pericardial effusion, but to dilatation of the heart, as I demonstrated in several cases described in a monograph on adherent pericardium published two years ago. In severe cases, the cardiac dilatation may rapidly become extreme, and the patient succumb within a few days of the first appearance of the pericardial rub, from a syncopal attack, which is sometimes associated with severe vomiting. In favourable cases, the friction rub disappears after a few days, and the cardiac dilatation rapidly decreases till the heart again regains its normal size, so that the patient eventually may be little the worse for the attack. More commonly, especially in a second attack of pericarditis, the inflammatory process seems to assume a subacute form; the pericardial rub persisting over a varying area for some days or weeks, and the area of cardiac dulness remaining unaltered, and even increasing in extent.

Eventually, within from six weeks' to three months' time, one of three things may happen—

1. The area of cardiac dulness may decrease till it is nearly normal in extent, indicating that the heart has approximately regained its normal size, in which case a satisfactory recovery may be anticipated;
2. The area of cardiac dulness may remain permanently enlarged, though the patient has become convalescent, in which case it is probable that universal adherence of the pericardium to the heart is taking place, and, though the patient recovers, the heart will be permanently crippled;
3. The area of cardiac dulness may still further increase, the liver become enlarged, and dropsy set in, and the patient die with all the symptoms of right ventricle failure.

It seems probable that the prognosis in each case depends on the degree to which the myocardium is affected by the inflammatory process. If only the superficial layers of muscle in proximity to the pericardium are affected, the heart may rapidly contract down again to its normal size, and is little the worse; if the inflammation is more protracted and extended, and involves the deeper layers of the myocardium, the heart is unable to recover for some little time, and the pericardium becomes adherent to it, while it is in a condition of dilatation from which it never completely recovers.

In the third group of cases, the myocarditis is so severe and extensive that the greater proportion of the muscular substance is involved, and the heart walls gradually yield, as the inflammation spreads through them, till a condition of extreme dilatation is induced, and, in addition to this, the pericardium may also become universally adherent.

Dr. Sturges, in his Lumleian lectures, demonstrated that in these protracted cases of pericarditis there is well-marked evidence, post-mortem, of myocarditis, the muscular fibres being swollen, their striation lost, and the tissues infiltrated with leucocytes.[1]

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[1] "Heart Inflammation in Children," *Brit. Med. Journ.*, London, 1894, vol. i. p. 510.

As an illustration of the life history of such a case, the following may be quoted:—

H. D., æt. 9, was admitted to the Children's Hospital, Great Ormond Street, 11th December 1893, with a history of pains in the joints, fourteen days previous to his admission. When first seen his heart was considerably dilated, and a mitral systolic murmur was audible at the apex. Five days after admission a pericardial rub was heard, which persisted for about a week, during which time the cardiac dilatation increased. A week later he began to improve, and the area of cardiac dulness gradually decreased on 15th February 1894, two months after the onset of the pericarditis; the area of cardiac dulness was almost normal in extent, and he was sufficiently recovered to go to a convalescent home. A month later, he had a fresh attack of rheumatism with an eruption of nodules, and was readmitted 15th March; there was slight œdema of the legs, and rheumatic nodules were present on the elbows; the area of cardiac dulness was again greatly enlarged, and he suffered from severe dyspnœa. From this time he steadily got worse, the œdema of the legs rapidly increased, the liver became greatly enlarged, the veins of the neck distended and pulsating, and he died on 21st April, with extreme symptoms of venous engorgement and right ventricle failure. At the post-mortem all the cavities of the heart were greatly dilated; the pericardium was universally adherent by recent adhesions, the muscle was soft, and showed evidence microscopically of myocarditis; there was no serious valvular lesion, though a few recent vegetations were present on the mitral valve. Myocarditis and adherence of the pericardium to the dilated heart were thus responsible for his death. The symptoms were those of venous engorgement and right ventricle failure, as the right ventricle with its comparatively thin walls was more rapidly rendered helpless by the myocarditis, and more hampered by the adherent pericardium than the left, with its greater thickness of muscular tissue.

If we can thus explain the ultimate cause of death in these cases of protracted pericarditis, a similar explanation is not permissible in those in which pericarditis proves rapidly fatal. Dr. Sturges demonstrated that in the case of a child who died within three days of the onset of pericarditis, the muscular tissue of the heart showed microscopically no evidence of inflammation, though all the cavities of the heart were greatly dilated. If one may make a suggestion, it seems probable that in these rapidly fatal cases a paresis of the cardiac muscle takes place, analogous to that which occurs in the muscular coats of the intestines, and in the abdominal walls in acute peritonitis. Possibly the nervous mechanism controlling the involuntary muscle is, in both instances, so affected by the intensity of the inflammation as to give rise to this paresis, but the exact means by which this is effected is a question which requires further investigation.

We must now consider how we are to recognise the subjects in whom repeated attacks of cardiac inflammation are likely to occur. There are certain unmistakable danger signals for which we should always be on the lookout in children or young adolescents when a suspicion of rheumatism is aroused. These are *rheumatic nodules*, small fibrous growths commonly about the size of a split pea, but sometimes as big as an almond, or even larger. They are found in the neighbourhood of joints, over the olecranon or condyles of the humerus, on the margins of the patella, over the malleoli, on the finger joints, on the sheaths of tendons; sometimes on the scalp or vertebral column, and are attached by their bone to the fascia, or sheaths of tendons, or to some portion of underlying fibrous tissue. The skin over them is freely movable, and they are best seen by flexing the joint over which they are situated when the skin is rendered tense. They were first described by Barlow and Warner in 1881.[1] In themselves they are painless, and cause little or no discomfort to the patient, but they indicate that the rheumatism to which they owe their existence has got a firm hold on its victim, and, when they are present in force, danger to the heart is imminent, and repeated attacks of cardiac inflammation are to be apprehended. Dr. Cheadle, in his work on the rheumatic state in children, has called attention to their evil prognostic significance, and says that they are apparently serious in proportion to their size and numbers. To quote his words: "They mean persistent cardiac disease, generally uncontrollable, and marching almost infallibly to a fatal ending." They may come and go, and last from a few days to several months. They are rarely found in adults, but are met with in children and adolescents up to the age of 19. Last year I saw three patients, æt. 12, 14, and 19 respectively, in whom nodules were present in abundance, and who all died, the first from endocarditis with pericarditis, the second from endocarditis and myocarditis, apparently uncomplicated by pericarditis (but in this case no autopsy was obtainable), the third from endocarditis and cardiac failure in association with adherent pericardium.

Exudative erythemata, of the type of erythema marginatum, or less commonly papular or urticarial in character, may occur in rheumatic subjects; they are not so frequently met with as nodules, but they may occur in conjunction with them, or alone, and they have also an evil prognostic significance.

In erythema marginatum, small raised patches about the size of a sixpence, with sharply defined margins and of a dull red colour, make their appearance. The centre of the patch usually undergoes absorption, and becomes of a pinkish or pale colour, while the margins continue to spread as narrow raised red bands with irregular outline. The eruption is usually accompanied by some rise of temperature, and lasts a few days, gradually fading and leaving a slight brownish discoloration.

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[1] *Trans. Internat. Med. Cong.*, London, 1881.

Chorea is another rheumatic manifestation common in children, but its outbreak is not of such serious significance as regards danger to the heart as are nodules and exudative erythemata, nor is it in all cases possible to prove its rheumatic origin. Frequently, valvular murmurs are developed during an attack of chorea, and these may be due only to temporary cardiac dilatation or anæmia, and may disappear when the patient regains his health; but they also may be due to concomitant endocarditis, about the rheumatic origin of which there is no doubt, and serious valvular lesions may result. When endocarditis does arise in children suffering from chorea, it is not usually associated with or followed by pericarditis, as is the case in those where nodules are present; happily, pericarditis is not a very common complication of chorea, but when it does arise the prognosis is very grave. Though, however, a large proportion of children escape heart mischief during an attack of chorea, it must not be forgotten that chorea is an evidence of the rheumatic taint, of which the next manifestation may be cardiac inflammation.

In the *treatment* of rheumatic affections of the heart in children, various local applications, such as ice-bags, leeches, or blisters over the præcordial area, have been advocated. Of these, ice-bags are the most useful, as they relieve pain in acute pericarditis, and, according to Dr. Lees, limit the amount of cardiac dilatation. Leeches may be employed at the outset of pericarditis, and followed by ice-bags, if desired; blisters are better suited for the later and more chronic stages. The administration of salicylates, which in the acute articular rheumatism of adults are given with such marked beneficial results, is of doubtful service; and when drugs are given, an effervescing mixture, containing quinine and bicarbonate of potash, is perhaps as useful as any. Nothing, however, in severe cases seems to arrest or exert any controlling influence on the course of cardiac inflammation in children, when once it has gained a firm hold. It is, therefore, of the first importance that any indications of danger threatening the heart should be recognised as early as possible, and due precautions taken. If, then, a suspicion of rheumatism is aroused by complaints of stiffness in the joints or pains in the limbs, in a child who comes of a rheumatic stock, or who has previously suffered from chorea or some other rheumatic manifestation, the patient should be kept under careful observation, and the heart examined every two or three days for some weeks. Any exposure to chill should be guarded against, and exercise should be limited in amount for some time after all apparent symptoms have subsided.

When nodules are present, danger to the heart is imminent. The child should be kept in bed, and the heart should be examined, the morning and evening temperature taken, and the rate of pulse and respiration noted every day, till these ominous signals have disappeared. Where possible, children who have once suffered from cardiac inflammation, more especially where this was associated with nodules, should winter in some warm dry climate.

In conclusion, I should like to acknowledge my indebtedness to Dr. Cheadle's most valuable lectures on "The Rheumatic State in Children," delivered before the Harveian Society in 1889 (to which reference has already been made), in which the distinctive features of rheumatism in children were first pointed out.

THE SERUM TREATMENT OF DISEASE.

By J. W. Washbourn, M.D., F.R.C.P., *Physician to the London Fever Hospital, Assistant Physician, and Lecturer in the Medical School, Guy's Hospital, London.*

To fully appreciate the principles of serum therapy, a general knowledge of the mode of action of pathogenic bacteria and of the main features of immunity are requisite.

The diseases produced by bacteria may be divided into two main classes—the *toxic* and the *septic.*

Tetanus and diphtheria may be taken as examples of the toxic class. In these diseases the bacteria remain localised to the seat of inoculation, without invading the organs or the blood, and the ill effects are caused by the elaboration and subsequent absorption of powerful toxins. These toxins are not only formed within the tissues of infected animals, but are also produced in cultivations upon artificial media.

Anthrax may be taken as an example of the septic class. The anthrax bacillus produces only a very feeble toxin, either in the body or in artificial cultivations. The failure to produce a powerful toxin is, however, compensated for by its power of invading the blood and tissues. As long as the bacilli remain localised to the seat of inoculation no serious symptoms are produced, and it is only when a general invasion of the body has taken place that life is in jeopardy.

Besides these main groups, there are intermediate groups of diseases, which cannot be placed in either category. Pneumonia may be taken as an example of such an intermediate group. The pneumococcus may cause death without invading the whole of the body, but it does not prove fatal unless a large area of lung tissue is involved.

We must not attempt to define any of these groups too accurately. Even in diphtheria a few bacilli may escape into the organs. Nevertheless, it is important to bear in mind the fact, that some bacteria are harmful, chiefly in virtue of their power of producing toxins—and others, in virtue of their power of invading the blood and internal organs.

Immunity is of two kinds—natural and acquired. We shall have to consider each kind separately, as different factors are involved. Many animals enjoy a natural immunity to infection with bacteria which are pathogenic to other animals. For instance, mice are insusceptible to diphtheria, and fowls to anthrax.

The immunity of mice to diphtheria is due to the fact that their tissues are not affected by the diphtheria toxin. The immunity of fowls to anthrax is due to the fact that this micro-organism is destroyed by the cells and fluids of the animal. In man we frequently meet with individuals who are naturally immune to infectious diseases to which the majority of individuals are susceptible.

Immunity and susceptibility are always relative and never absolute. On the one hand, all animals possess a certain amount of natural resistance to infection with any bacterium, provided the dose is small or the virulence is low. For example, guinea-pigs, which are very susceptible to diphtheria, can resist infection when inoculated with a very small dose. On the other hand, resistant animals can be rendered susceptible by lowering the vitality of their tissues. For example, fowls can be infected with anthrax when the vitality of the tissues is lowered by exposure to cold. We meet with the same phenomena in man. An individual may be exposed to infection on many occasions with impunity, but becomes affected when, from some cause or another, the vitality of his tissues is impaired.

It is possible to increase the natural powers of resistance of an animal by appropriate means. By injecting sterile broth into the peritoneal cavity of a guinea-pig the natural resistance is temporarily increased, and the animal is no longer affected by inoculation with a minimal fatal dose of certain pathogenic bacteria. Dr. Durham has made the suggestion that a similar procedure might be advisable before making abdominal sections, in cases where there is danger of infection occurring.

The natural resisting power of an insusceptible animal cannot, by any means we are acquainted with, be transmitted to susceptible animals. The blood of an animal naturally immune to any bacterium has no power of protecting a susceptible animal against infection with the same bacterium. It is in this respect that a natural immunity differs from an acquired immunity—a subject which we must now consider.

Immunity to bacterial disease can be acquired in various ways. Experimentally, it can be induced by the injection of toxins, or by inoculation with attenuated cultivations; in the human subject it is acquired by a previous attack of the disease.

There are two kinds of acquired immunity. In the one form the animal is rendered insusceptible to inoculation with living bacteria, but remains just as susceptible as before to bacterial toxins; in the other form the animal is rendered insusceptible both to the living bacteria and to their toxins. An animal can thus be rendered bacteria immune, without becoming toxin immune; but if it is rendered toxin immune, it becomes at the same time bacteria immune.

These two kinds of immunity are respectively associated with the appearance in the blood of *antibacterial* and of *antitoxic* substances. The antibacterial substance may appear in the blood alone. The antitoxic substance never occurs alone, but is always accompanied with antibacterial substances.

Now, these substances not only protect the animals in whose blood they are formed, but they will also protect other animals when injected into their tissues; the antitoxic substances protecting against the toxins, and the antibacterial substances protecting against the living bacteria. This indeed is the basis of serum therapy, and it is important to remember that the sera are of two kinds—antitoxic and antibacterial.

As examples of antitoxic serum, we may take the diphtheria antitoxin or the tetanus antitoxin; and as examples of antibacterial sera, we may take the antistreptococcic and the antipneumococcic sera. There are certain general principles which must be borne in mind in connection with all protective sera. In the first place, they will protect when injected before infection, but the protection does not last for more than a few days, a matter of great importance in regard to the use of these sera as preventive measures.

In the second place, less serum is required to protect when injected before than after infection.

Lastly, if the serum is injected too late after the infection, it has no protective power whatever, however large the dose given. This can easily be explained. At a late stage of the disease the animals are suffering from the results and not from the direct effects of the bacteria and their toxins, and the serum only protects against the direct effects. An analogous case is seen with simple poisons. A patient poisoned with carbonic oxide may first develop dangerous symptoms some time after the gas has disappeared from the blood.

We will now turn to the more practical part of our subject, and will consider the preparation and use of the diphtheria, tetanus, antistreptococcic, and antipneumococcic sera.

DIPHTHERIA ANTITOXIN.—The diphtheria antitoxin is prepared from the blood of the horse. The animal is treated for some months with injections of the diphtheria toxins in increasing doses. It is then bled, and the blood serum separated. The toxins are prepared from cultivations of the diphtheria bacillus in fluid media, the living bacteria being separated by filtration through an unglazed porcelain filter. The operation of bleeding is performed under careful aseptic precautions. The blood is withdrawn by means of a cannula, and is conducted by an indiarubber tube into a sterile bottle. The serum is allowed to separate, and is then decanted into small bottles, a small quantity of an antiseptic being added. Great care is necessary in this process. If it is carelessly performed, the serum may become contaminated with bacteria. I have heard of at least two instances where death has resulted from the use of antitoxin thus contaminated.

The serum is next *standardised.* The method consists in estimating the smallest quantity of the serum which will neutralise the effect of a certain dose of toxin when injected into the subcutaneous tissue of a guinea-pig. The unit recommended by Ehrlich is as follows:—" A serum of which 1 c.c., when mixed with a hundred times the fatal dose of toxin, protects a guinea-pig of 250 grms. weight from death within four days, contains 1 unit per c.c."

The serum is *administered* by subcutaneous injection. Special care must be taken that the operation is carried out aseptically. The skin should be carefully cleansed and well washed with an antiseptic such as lysol or carbolic lotion. The syringe should be boiled just before use, and should not be laid down upon any surface which is not sterile. It is well to have ready a clean cloth rinsed out with carbolic lotion, upon which the syringe may be laid if required. If due precautions are not taken, some septic trouble may ensue. The injections are best made into the subcutaneous tissue of the flank, but the site is a matter of little importance.

The *dosage* depends upon the severity of the case. In all cases the first twenty-four hours of treatment is the period when the bulk of the serum should be injected. During this period, two, four, or six injections should be given, in mild, moderate, or severe cases respectively. For the next two days, one, two, or three injections may be given daily. If the patient shows no sign of improvement after three days' treatment, no benefit is likely to accrue from further injections. About 4000 units is an average dose for each injection. With a serum containing 200 units per c.c. the dose would be 20 c.c. As far as we know, the same quantity of serum should be used for a child as for an adult.

We have already stated that the earlier in the course of the disease the treatment is commenced, the better the chance of recovery. This is well exemplified by the statistics of the Metropolitan Asylums' Board. The mortality of the patients treated on the first day of the disease was 4·7 per cent.; on the second day, 12·8 per cent.; on the third day, 17·7 per cent.; on the fourth day, 22·5 per cent.; and on the fifth day and over, 24·6 per cent. It is true that before the introduction of antitoxin, the death rate was lower in the patients who were treated at these hospitals early than in those treated late, but the difference of mortality on the different days of the disease was by no means so marked as is the case under the antitoxin treatment.

The beneficial results of the antitoxin treatment can be gauged by two methods—statistics of mortality and clinical observation upon the course of the disease.

There is now an enormous mass of statistics uniformly showing a decrease of mortality under this treatment. We will here only quote the statistics at Guy's Hospital, which have been prepared for us by Mr. J. G. Taylor.

These statistics refer to cases of tracheotomy for diphtheria at Guy's Hospital in children under 5 years of age.

Date.	Cases.	Deaths.	Mortality per Cent.
NON-ANTITOXIN.			
1887 . . .	20	16	80
1888 . . .	14	8	57·1
1889 . . .	16	15	93·7
1890 . . .	18	14	77·7
1891 . . .	15	9	60
1892 . . .	22	19	86·3
1893 . . .	22	15	68·1
1894 . . .	19	16	84·2
Total . . .	146	112	76·7
ANTITOXIN.			
1895 . . .	10	2	20
1896 . . .	21	8	38·09
1897 . . .	8	1	12·5
Total . . .	39	11	28·2

Note.—In 1894 two cases were treated with antitoxin; both recovered. In 1895 one case, which was complicated with measles, was not treated with antitoxin, and died. In 1896 one case was not treated with antitoxin, and died. In 1897 one case was not treated with antitoxin, and died. None of these cases are included in the table.

A reference to these tables shows that the total mortality of the antitoxin years, 1895–1897, was 28·2 per cent.; while that of the non-antitoxin years, 1887–1894, was 76·7 per cent. The lowest mortality of the antitoxin years was 12·5 per cent., and of the non-antitoxin years, 57·1 per cent.

When the treatment is considered from pure clinical observation, the most prominent effect noticed is the rapidity with which the membrane clears off. The faucial and glandular swellings subside more rapidly, and the patient convalesces more quickly than with any other mode of treatment. No direct effect is produced upon the pulse or upon the temperature. It is difficult o say whether albuminuria is increased by the treatment with ntitoxin. Albuminuria is a common symptom in diphtheria, but he statistics upon this point are not reliable. There is certainly o evidence that antitoxin produces nephritis or suppression of rine. The incidence of paralysis is increased, but this appears o be due to paralysis supervening in cases which, under other reatment, would have died before the onset of paralysis.

Laryngeal cases are those most benefited by treatment with ntitoxin. This is probably due to the nature of the tissues of he fauces and larynx. In faucial diphtheria the toxins are more rapidly absorbed than in laryngeal diphtheria; and thus, by the time the treatment is commenced, the toxins have produced changes in the tissue which are not influenced by antitoxin.

Antitoxin is sometimes used as a *prophylactic* measure. In this connection its use is restricted to cases which have been definitely exposed to infection, for the protection afforded by antitoxin only lasts a few days. When one or two children in a family are attacked with diphtheria, it may be advisable to treat the other children with antitoxin. Personally, I prefer to have the throat systematically examined for diphtheria bacilli, and to use antitoxin immediately bacilli are found.

Ill effects.—We must now inquire what ill effects may ensue after the injection of antitoxin.

Several cases have been recorded in which fatal collapse has ensued immediately after the injection of antitoxin. The cause for such an event is difficult to assign. Similar results have occurred after the subcutaneous injection of morphia.

Septic trouble may arise from contamination of the serum, either during the process of preparation or during the injection. I have heard of two fatal cases due to the former cause, and in the Metropolitan Asylums' Board statistics, thirty-five cases of abscess (1·2 per cent. of total cases) are recorded. Septic trouble can be avoided by care in selection of the antitoxin, and by taking aseptic precautions during the injection. I have never had a case under my own care in which septic trouble of any kind has arisen, or indeed in which any alarming symptoms have occurred.

Rashes, joint pains, and pyrexia with or without rashes and joint pains, frequently occur. In the Metropolitan Asylums' Board Hospitals rashes occurred in 35·2 per cent., joint pains in 6·5 per cent., and pyrexia in 19 per cent. of the cases. These complications come on, as a rule, about a week or ten days after the injections, but they may occur earlier or later.

The rashes are usually either urticarial or similar to the rash of measles. Less frequently they are of a scarlatiniform character. Sometimes the resemblance to measles is so great that an error in diagnosis may occur. The absence of the other symptoms of measles, and the period at which the rash occurs after the injection, should put one on the right track. The pyrexia may be as high as 103° or 104°, and the joint pains may be severe, but no effusion into the joints occurs.

These effects are not due to the antitoxin itself, but to the presence of other substances in the serum. They occur less frequently when small doses of powerful antitoxin are used. They also depend, to some extent, upon the animal from which the serum is prepared. Some sera more frequently produce these complications than do others.

ANTITETANIC SERUM.—The tetanus serum is, like the diphtheria serum, an antitoxin. It will protect against the tetanus toxin, as well as against the living bacteria.

The method of preparation and standardisation is similar to that employed with diphtheria antitoxin, the only difference being that the horses are treated with tetanus toxin instead of with diphtheria toxin.

Although the tetanus antitoxin is more potent than the diphtheria antitoxin, when tested upon animals, nevertheless the results of treatment in the human subject are much less satisfactory.

On account of the rarity of the disease it is impossible to get accurate statistics, so that we must rely upon clinical observations. The comparatively small experience of any one observer renders clinical observations of less value than would be the case were the disease more common. Taking everything into consideration, we may say that, although some cases have been distinctly benefited by treatment, in the majority very little effect has been produced. The reason for this is not far to seek. In considering the experimental side of the question, we found that, after a certain stage in the course of the disease, no amount of antitoxin produced any effect. When the toxins have already injured the tissues, the antitoxin has no effect upon such injury. Now, in tetanus we do not recognise the disease until the tissues have already been injured. We can compare the convulsive stage of tetanus to the paralytic stage of diphtheria, and we know how hopeless it is to start the treatment of diphtheria at this stage.

ANTISTREPTOCOCCIC SERUM.—The antistreptococcic serum differs from the diphtheria and tetanus sera in being antibacterial and not antitoxic.

It is prepared from the horse by the injection of living cultivations of a virulent streptococcus. It is standardised by observing what quantity, when injected twelve hours previously into the peritoneal cavity of a rabbit, will protect against a multiple of the fatal dose of living bacteria.

The standardisation of the serum is a difficult process. The streptococcus varies greatly in virulence, and possibly in other ways, and it is difficult to keep the virulence constant. Consequently the serum is frequently supplied without having been carefully standardised, and this will account, at any rate to some extent, for the divergence of results that have been obtained in the treatment of human patients. It is also possible that the serum may be of benefit in cases of infection with certain varieties of streptococci and not with others. The question whether the different streptococci producing disease in the human subject are distinct varieties, is still *sub judice.*

Whatever may be the cause, it is quite certain that antistreptococcic serum sometimes produces most marked beneficial results, while in other apparently similar cases no effect whatever is produced. The results are most perplexing.

As to the class of case in which the serum is likely to be of benefit, we may say that any streptococcal infection is suitable. Under this category come most cases of puerperal fever, many cases of ulcerative endocarditis and of septicæmia, and practically all cases of septicæmia following upon scarlet fever.

In many cases of ulcerative endocarditis and of puerperal fever it is impossible during life to be sure that the infection is due to the streptococcus, and the treatment must be used on the probability of the diagnosis being correct.

As far as my own experience is concerned, I have published a case of ulcerative endocarditis in which I am quite satisfied the disease was cured by the treatment. I have also had apparently most beneficial results in the treatment of cases of septicæmia. In cases of septicæmia following upon scarlet fever, I have hitherto met with no success. Similar experiences have been recorded by others, and many successful cases of puerperal fever have been published in this country.

The dose of the antistreptococcic serum is about 20 c.c. The frequency of administration depends upon the nature of the case. In acute cases the injections may be made as often as every four or six hours. In chronic cases the injections should be made daily for a long period. In the case of ulcerative endocarditis above referred to, the injections were made daily for nine weeks.

ANTIPNEUMOCOCCIC SERUM.—The antipneumococcic serum, like the antistreptococcic, is antibacterial and not antitoxic. It is prepared in the same manner, it can be accurately standardised, and the dosage is similar. It should only be used in typical cases of croupous pneumonia, for there are other forms of pneumonia caused by different micro-organisms. It would be premature to say very much about the results of the treatment. It has been hitherto impossible to supply a sufficient quantity of the serum to test it on a large scale. The cases which I have already published are sufficiently encouraging to make one hope for good results in the future.

The tetanus, antistreptococcic, and the antipneumococcic serum may produce rashes, joint pains, and pyrexia similar to those caused by the diphtheria antitoxin.

Our knowledge of *other protective sera*, used in the treatment of disease, such as the typhoid serum, is so scanty that it is useless to discuss them at the present time.

ON THE USE OF THE SENECIOS IN FUNCTIONAL AMENORRHŒA.[1]

By W. E. Fothergill, M.A., B.Sc., M.D., *Manchester*.

History and previous observations.—The genus *Senecio* is typical of the tribe of plants known as the Senecioidæ, which belongs to the sub-order Tubilifloræ of the Compositæ. Several species of the genus are very common and widely distributed. In Dr. Blanchard's "Physical Dictionary" I read: "*Senecio—Groundsel.*—The juice of the Herb taken in beer; or a Decoction of it with Hony, Vomits gently: outwardly applied, it is good for inflammations of the Paps, and for the King's-evil." In other old books it is described as forming a good wash for sore mouths, and is said to cure the vomiting of young children. *Senecio vulgaris* seems to have been used as a vermifuge by English veterinary surgeons; while, in 1831, Finazzi[2] described it as useful in epilepsy.[3] The common ragwort, *Senecio Jacobœa*, and some other members of the genus, have long enjoyed, in popular medicine, some reputation as emmenagogues. In old English herbals the ragwort is named the "Female Regulator," and, in America, *Senecio aureus*, under the name of "Life Root," has long been used in menstrual derangements.[4] *S. maritimus* is said to be employed as an emmenagogue on the French sea coast, and several other species seem to have been put to a similar purpose.

In 1894, Murrell published the results of some interesting experiments[5] made with *S. Jacobœa* and *S. aureus*. In 1896, Dalché and Heim[6] communicated to the Société de Thérapeutique preliminary notes on the study of the senecios as emmenagogues. Their paper was followed by a report on a series of clinical observations made by Drs. Bardet and Bolognesi, with a view to throwing further light on the same subject. Some discussion followed, in which a prominent part was taken by M. Blondel.

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[1] Being an essay awarded the Milner Fothergill Gold Medal in Therapeutics, 1897.

[2] *Ann. univ. di med. e chir.*, Milano, 1831, p. 16.

[3] Loza (Maximo de la), *Gazz. med. ital. lomb.*, Milan, 1866.

[4] Graham, *New York Med. Journ.*, 1845, p. 366; Goss, *Amer. Med. Journ.*, Saint Louis, 1881, p. 270.

[5] *Brit. Med. Journ.*, London, 1894, vol. i. p. 679.

[6] *Bull. gén. de thérap., etc.*, Paris, July 8, 1896.

Murrell.—Murrell made a 1 in 10 tincture of the whole plant of *S. Jacobœa*, and began taking ½ drm. thrice daily, increasing the dose till he was taking ½ oz. four times daily, with no injurious effect. A student took ½ oz. four times daily with no evil result. Murrell next used, in doses of twenty drops four times daily, liquid extracts of *S. Jacobœa* and of *S. aureus*. He also employed senecin, "a dark brown resinous-looking substance obtained from the senecios," whose minimum dose was 2 to 3 grs., given three or four times daily. He mentions the seven cases named below.

CASE 1.—A girl menstruated on January 12, took senecio from March 5 till June 27 with one short break, and was then found to be five months pregnant. From this Murrell concludes that the drug is not an ecbolic.

CASE 2.—A girl, æt. 18, who had always been regular, on becoming a hard-worked chambermaid, had five months' amenorrhœa. She was not pregnant, and the menses reappeared after taking senecio for twelve days.

CASE 3.—A patient who had missed two menstrual periods, but was not pregnant, menstruated after taking six 2-drm. doses of tincture senecio.

CASE 4.—A patient, delivered of twins in December, weaned them in two weeks, but did not menstruate till March 18, after taking ext. liq. sen. 20 minims, thrice daily for four days.

CASE 5.—A patient, who was suckling a child 5 months old, took senecio for a few days, and then menstruated for four days.

CASE 6.—A patient, who had never menstruated, suffered every month from bleeding from the mouth and gums. Senecio caused correct menstruation to replace the so-called vicarious hæmorrhage. A second administration caused menstruation again two weeks later.

CASE 7.—A girl, æt. 17, menstruated regularly, but the flow was scanty and accompanied by spitting of blood. On taking senecio, the menstrual discharge became profuse, and blood-spitting disappeared.

Murrell says: "I found that it succeeded admirably in those cases in which the menstrual function, having been established and performed regularly for some months or even years, was delayed or suspended, as the result of exposure to cold or some similar cause. In cases in which the amenorrhœa was associated with or dependent on anæmia, senecio uniformly failed to do any good until the anæmic condition had been removed by iron. In cases in which the menstrual flow has never been established, senecio is frequently most useful, and in four cases of vicarious menstruation—the blood coming from the mouth or gums—nothing could have been more satisfactory. I am satisfied that senecio not only anticipates the period, but that it also increases the quantity. In many cases of dysmenorrhœa it promptly relieves the pain and not infrequently the headache from which many women suffer at those times. Senecio is apparently not an ecbolic."

Dalché and Heim.—Dalché and Heim used for some of their experiments American liquid extract of *S. Jacobæa* obtained from England. They used principally the aqueous and alcoholic extracts of *S. vulgaris*, brought to a solid consistency and mixed. This was made into pills weighing ·2 to ·4 grms.

During six weeks, a young bitch, of small size, took 144 grms. of the consolidated extract. She lost weight during the first few days, but soon regained it. She suffered from no gastro-intestinal symptoms, and gave no sign of pelvic congestion. The American liquid extract, given to guinea-pigs by intra-muscular and intraperitoneal injection, was harmless in small doses, but proved fatal in large doses. Further experiments showed, however, that the fatal doses contained a quantity of alcohol sufficient to cause the death of the guinea-pigs apart from the action of any other substance. Considerable quantities of the extract were given to pregnant guinea-pigs, without causing abortion or otherwise affecting the course of pregnancy, though the alcohol in the extract again manifested itself in the demeanour of the animals. Dalché and Heim also gave senecio to fifteen patients—in three cases without result, in three with doubtful result, and in nine cases with positive result. They mention only the two cases named below.

CASE 1.—A neurotic patient with dysmenorrhœa, who had previously had a period of six months' amenorrhœa, suffered from a second period of amenorrhœa of three months' duration. She was not pregnant, and suffered from pain and leucorrhœa at the epochs corresponding to menstruation. Under the influence of senecio at one of these epochs, the pain was relieved; an hysterical attack occurred on the third day, and was followed by menstruation four days later.

CASE 2.—A woman, æt. 27, with mitral disease, had hæmoptysis at her menstrual periods, subsequent to an occasion on which the flow was checked by an accidental immersion in cold water. She was put at rest, and at the next menstrual epoch senecio was administered. She menstruated abundantly and without hæmoptysis.

Dalché and Heim conclude that the drug relieves painful menstruation if the reproductive organs are healthy, but not otherwise. They remain doubtful whether senecio provokes the menstrual flow, and they offer no hypothesis as to its mode of action.

Bardet and Bolognesi.—Bardet and Bolognesi[1] made, during 1895-96, twenty observations in cases of amenorrhœa and dysmenorrhœa. The solidified extract of Dalché and Heim was administered in quantities of 25 cgrms. up to 2·5 grms. daily. The cases are published in full, and were as named below.

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[1] *Bull. gén. de thérap., etc.*, Paris, July 23, 1896.

CASES OF AMENORRHŒA.

No.	Cause.	Age.	Periods Missed.	Total Grms. of Senecio.	Days of Treatment.	Result re Amenorrhœa.	Remarks.
1	Epilepsy . . .	17	4	5	5	Cured.	...
2	Chlorosis . .	21	2	5	5	,,	2·5 grs. a month later needed.
3	Hysteria . . .	20	2	3·75	5	,,	...
4	Cerebral . . .	...	8	5	5	,,	Treatment repeated three times.
5	Tuberculosis . .	28	12	2	3	Men	Treatment not repeated.
6	Puerperal fever .	25	3	2	3	Cured.	...
7	Rheumatism (gonorrhœal)	23	3	2·50	4	,,	...
8	Tuberculosis . .	20	2	1·50	3	Men.	Treatment not repeated.
9	Exophthalmic goitre	23	3	3·75	5	Cured.	...
10	Indefinite . .	36	1	2·50	3	,,	...
11	Anæmia and fatigue	24	1	3·75	5	,,	...
12	Shock . . .	25	1	2·50	3	,,	...
13	Pregnancy (?) . .	30	1	Small.	...	Nil.	...

CASES OF IRREGULARITY.

14. Girl, æt. 24 ; irregular menstruation—rendered regular.
15. Girl, æt. 25 ; irregular menstruation—rendered regular.

CASES OF DYSMENORRHŒA.

16. Hysterical patient, æt. 16—2·50 grms. in five days—temporary relief.
17. Patient with metritis, æt. 30—no success in relieving pain.
18. Patient, æt. 27, irregular—became regular, but pain not relieved.
19. Patient, æt. 20, irregular—became regular, but pain not relieved.
20. Patient, æt. 30—pain increased and nausea caused by senecio.

Bardet and Bolognesi conclude that senecio has the constant property of provoking menstruation, though administered in small and harmless doses. They hold that it always tends to regularise menstruation, but that it does not relieve pain at the periods, and does not increase the quantity of the discharge: They suggest that it both produces congestion of the reproductive organs, and also excites contraction of the uterine muscle.

These concluding statements are open to criticism, for the paper in question conveys to the reader the impression that senecio causes menstruation by producing both pelvic congestion and contraction of the uterus. This is unfortunate, as neither of these phenomena can be considered as causes of menstruation. It would indeed be more true to state that menstruation causes pelvic congestion, while with uterine contraction menstruation has no connection at all. For the supposition that senecio causes pelvic congestion, and so provokes menstruation, no evidence is brought forward. In the discussion at the Société de Thérapeutique, however, Dr. Bardet mentioned the cases on which he bases the statement that the drug can cause contraction of the uterus. A woman, æt. 38, suffered from nausea and hypogastric sensations recalling to the mind those of pregnancy, on three occasions after she had taken senecio. But subjective phenomena described by a patient are very slight evidence on which to base a statement, as Bardet does, to the effect that her uterus contracted. The other case is equally slight. A woman missed a menstrual period, and thereafter took some senecio obtained from a friend who had been under M. Bardet's care. The menstrual flow appeared in two days. M. Bardet discovered in the discharge some *membranes organisées*, and drew two conclusions—(1) That the woman had been pregnant, and (2) that the abortion had been caused by senecio. There are various kinds of *membranes organisées*, and if Bardet had assured himself that those in question were of fœtal origin, he would surely have made the point clear to the reader. Even granting that the woman was pregnant, it remains to be proved that the senecio taken was the cause of abortion.

Blondel remarked[1] in the discussion that the reports on the physiological action of senecio were both vague and contradictory, and that, until the action of a drug was definitely known, its indications and contra-indications could not be established. Amenorrhœa, he said, was not a disease but a symptom, and its causes must be discovered before they could be attacked. In half the cases seen, it was, he said, due to pregnancy, whose diagnosis during the early months was beset with difficulties. Therefore he thought the treatment of amenhorrœa should always be indirect, both for fear of causing abortion and in order to preserve a true clinical spirit. The drugs which acted directly in provoking menstruation were, he thought, unreliable, dangerous, and of merely temporary effect.

Now these remarks of Blondel, though they may catch the sympathy of a superficial reader, are not likely to deter anyone from giving due attention to the work of the authors above mentioned. For, to consider his objections, if no drug may be used until its action is definitely known, there is practically an end to the introduction of new therapeutic agents, and the use of many old ones would have to be discontinued. Again, in certain cases, amenorrhœa is not a symptom of any pre-existent disease, but is due to the action on the nervous system of various external and temporary influences. Secondary bad effects, both mental and physical, follow the amenorrhœa, which is in such cases a primary disorder, and one certainly demanding direct treatment. Thus,

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[1] *Bull. gén. de thérap.*, Paris, July 23, 1896.

Edelheit[1] mentions four cases in which amenorrhœa inaugurated a primary and serious affection, fatal in two of them; recovery in the other two following the re-establishment of menstruation. Further, the difficulties which beset the diagnosis of pregnancy are not insuperable, and there is no need to administer a possible ecbolic while still in doubt. Lastly, granting that the so-called emmenagogues now in use are unsatisfactory, there is no reason *a priori* why a new one—safe, reliable, and perhaps even permanent in action—should not be discovered.

PERSONAL OBSERVATIONS.—The preparations used in my own experiments were three in number—namely—(1) A 1 in 10 tincture of Sen. jacob., made by Munro of London; (2) the brown resinous substance of Murrell—senecin—made into 1-gr. tabloids by Burroughs & Wellcome; (3) a 1 in 1 liquid extract, made for me, according to the formula of Mr. W. Kirkby of Manchester.[2] This was the preparation chiefly used. The doses generally given were 1 drm. to 3 drms. of the tincture, 2 grs. to 3 grs. of senecin, and 20 minims to 30 minims of the extract, each of them three or four times daily.

The cases in which I have employed these preparations fall into four groups, and tend to provide the answers to four questions, thus:—

1. In pregnant women—Does senecio cause abortion?
2. In amenorrhœa—Does senecio cause menstruation?
3. In persons menstruating regularly—Does senecio cause the flow to appear earlier than usual?
4. In dysmenorrhœa—Does senecio relieve pain?

Lest the drug should act by suggestion, it was necessary in all cases to avoid informing the patient that the medicine given was intended to affect her menstrual function.

I. *Cases of pregnancy.*—CASE 1.—A. H., æt. 23. Menstruation regular till four months ago. Took 3 drms. Tinct. sen. jacob. three times daily for two weeks, with no effect whatever. Pregnancy was then at four and a half months.

CASE 2.—D. B., æt. 28; regular; one previous pregnancy. Missed one period, and ten days later took Sen. jacob. 1½ drms. thrice daily for ten days, with no effect. She was then almost three months pregnant. (This patient previously had amenorrhœa without pregnancy, which was relieved by senecio; see II. Case 9).

CASE 3.—N. D., æt. 19; regular. Seven weeks after last period she took 20 drms. Ext. liq. sen. four times daily for two weeks without any effect. At the end of the administration she was nearly four months pregnant, pregnancy dating from a single coitus of known date, after which she menstruated once.

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[1] *Wien. med. Presse*, August 16 and 23, 1896.

[2] FLUID EXTRACT OF *Senecio Jacobæa.*—*Senecio Jacobæa* herb in No. 20 powder, 3 lb.; proof spirit, a sufficiency. The powder is to be exhausted by repercolation in three parts, the first 48 fluid oz. of percolate from the third percolator is to be reserved for use. One fluid oz. of the extract represents 1 oz. of the crude drug.—WILLIAM KIRKBY, F.L.S., etc.

Case 4.—M. D., æt. 33; regular. Three previous pregnancies. Patient missed two periods, and then took Tinct. sen. jacob. 1½ drms. four times daily for fifteen days. She had some nausea, which was probably ordinary "morning sickness" rather than the effect of the drug. She was about three and a half months pregnant at the end of the administration.

Case 5.—A. X., æt. 28; irregular painful menstruation; missed one period, and then took a tabloid of senecin, 1 gr., four times daily for ten days, without effect of any kind, and was then found to be almost two months pregnant.

Case 6.—B. Y., æt. 25; regular; missed two periods, and then took Liq. ext. sen. jacob. 20 minims thrice daily for nearly three weeks without any effect, after which she was found to be pregnant.

Case 7.—Miss H., æt. —; regular. Dr. Jones informs me that this patient menstruated on 19th November, and on 16th March began taking extract of senecio in 20 minim doses. She consumed no less than 6 oz. of the 1 in 1 extract during the next three weeks with no effect whatever. She was then examined, and found to be pregnant.

The above cases show, I think, that senecio will not cause abortion, or in any way influence the course of pregnancy. The practical utility of a drug which will cure functional amenorrhœa, but will not interfere with pregnancy, is of course obvious. A girl, for instance, is brought to the practitioner by her mother, amenorrhœa being the only symptom complained of. A physical examination is, for the time, out of the question, and a series of interrogations may cause unnecessary suffering. Functional amenorrhœa may be the condition, or pregnancy. Under these circumstances, senecio may be safely prescribed before making a diagnosis, as it will probably cure the one, and certainly will do no harm in the other.

II. *Cases of functional amenorrhœa.*—Case 1.—F. B., æt. 25. Menstruation began at 14; regular; type twenty-eight days; duration four days; no pain. Patient was confined six months before consulting for slight dyspepsia, but did not suckle the child at all. Alterations in diet were suggested, and Ext. senecio 20 minims, four times daily, prescribed. When this had been taken eleven days, the patient menstruated without pain for three days, and has since been regular.

Case 2.—M. M., æt. 18. Menstruation began at 14; regular; type twenty-eight days; duration two or three days; no pain. After sleeping in a damp bed patient had a period of five months' amenorrhœa. She was not pregnant, but fear of pregnancy may have had a causal connection with the complaint. No anæmia, no heart or lung trouble, well nourished. After taking 20 minims of extract of senecio four times daily for two days, she menstruated for two days, and has since been regular.

CASE 3.—E. K., æt. 39. Menstruation began at 15; regular; type twenty-eight days; duration three days; no pain. Four children, youngest æt. 9 years. Five months before consulting, the menses disappeared after a change of residence, and five periods were missed. The patient was well in all other respects, and dreaded pregnancy. After taking Ext. sen. 20 minims four times daily for a week, she menstruated for four days, and has since been regular.

CASE 4.—J. H., æt. 17. Never menstruated; dyspepsia and constipation; well nourished; well developed sexually; no organic disease. This patient took Ext. sen. 20 minims four times daily for two weeks, and then menstruated for three days. She has since been regular.

CASE 5.—H. H., æt. 22. Menstruation began at 14; irregular; four to five days' duration; some pain. Patient missed three periods, and complained of pain in abdomen. No other symptom or sign of disease. After taking 20 minims Ext. sen. three times daily for two weeks she menstruated as usual, with some pain, and has continued to do so at intervals varying from twenty-six to thirty days.

CASE 6.—F. O., æt. 25. Menstruation began at 15; regular; type twenty-six days; duration seven days; slight pain. Patient missed two periods soon after marriage, the cause apparently being hope of pregnancy. Complained of hypogastric weight and uneasiness. She was not pregnant, and after taking Ext. sen. 20 minims four times daily for ten days she menstruated as usual.

CASE 7.—M. R., æt. 32. Menstruation began at 13 or 14; regular; type twenty-eight days; duration three to five days; no pain. Last child weaned five months before consultation. Patient menstruated twice after weaning child, and then missed three periods. Suffers from chronic bronchitis; no phthisis. After taking Tinct. senecio 1½ drms. four times daily for a week, she experienced discomfort as if about to menstruate, but did not do so until a week later.

CASE 8.—E. R., æt. 24. Menstruation began at 12; regular; type twenty-eight days; duration three days; pain for five hours at commencement. One pregnancy, three years ago, which ended in abortion at third month. Patient a stout, healthy young woman, in hope of pregnancy; missed three periods, then menstruated twice, and again missed a period. She was not pregnant, and after taking 1-gr. tabloids of senecin four times daily for three days the menses reappeared.

CASE 9.—D. B., æt. 28. Menstruation began at 13; regular; type thirty-one days; duration five days; no pain; one pregnancy. Patient missed two periods soon after acquiring specific disease from her husband. Specific treatment was replaced for four days by Tinct. senecio 1½ drms. thrice daily; after which the menses appeared, and continued regularly till she became pregnant some months later; after which she took senecio without any effect. (See I. Case 2.)

CASE 10.—A. J., æt. 15. Had never menstruated. Consulted about bruised ribs. Mother very anxious for menstruation to begin. Patient was tall, well nourished, well developed sexually, and looked at least

18 years of age. Ext. senecio was given (20 minims thrice daily) for eleven days, when the menses appeared.

Case 11.—Mrs. K., æt. 27. After her first labour, which was normal, was able to nurse her baby for three or four weeks only. For five months after the complete disappearance of the milk there was no sign of menstruation. She then took liquid Ext. sen. jacob. 20 minims thrice daily for five days, when the menses appeared, and have since continued to do so regularly.

These eleven cases, in which senecio acted so well, were all cases of true functional amenorrhœa. No general disease, such as anæmia or phthisis, was present, nor was there any deficiency, congenital or other, of the reproductive organs. The nervous mechanism which initiates the menstrual flow was, however, inactive in each case, and senecio appeared to be effective in stimulating it into action. In cases of anæmia, however, and other conditions of exhaustion due to disease, I have found senecio quite inactive in restoring menstruation. In such cases the cause of amenorrhœa is, of course, that the patient has no blood to spare; and treatment by a direct emmenagogue cannot be expected to have any effect, while indirect treatment by food, iron, etc., is indicated. There is no object in detailing failures in cases of this kind, but two of a different nature are instructive. A girl of 18, who had never menstruated, was brought by her mother, and no complete physical examination was allowed at first. The patient appeared sound in all respects and well nourished. She was not anæmic, and complained of nothing but non-appearance of the menses. Senecio had no effect, and on examination being permitted I found the breasts poorly developed, the pubic hair arranged as in the male subject, and the labia small. The uterus was small and thin, and no ovaries could be felt, the case being one of congenital defect of the reproductive system. Another failure occurred in a woman of 35 who never menstruated after a confinement two years before I saw her. After unsuccessfully trying senecio, I found the vagina contracted and the uterus small and shrunken, the patient being subject of a premature menopause, due to superinvolution after her confinement.

III. *Menstruation antedated in healthy subjects.*—Certain minor gynæcological operations should be done soon after a menstrual period, and both patient and operator are often put to inconvenience by having to postpone the date of operation while waiting for menstruation to occur. In several cases of this kind it was interesting to find that the administration of senecio was followed by the appearance of the menstrual flow earlier than it was expected. The results are of value only in the cases of women who menstruate with perfect regularity, and the six experiments tabulated below were made in cases of this nature. They show that senecio antedates the flow, and that it does not increase it in quantity.

On the contrary, a period thus brought on prematurely appears o be of shorter duration than one occurring at the natural time. A menstrual cycle is shown for each patient. The flow was nduced six, nine, three, five, nine, and two days before it was expected to occur in these cases.

Day.	I. Mrs. W.	II. Mrs. A.	III. Mrs. K.	IV. Mrs. D.	V. Mrs. P.	VI. Mrs. T.
1	Men.	Men.	Men.	Men.	Men.	Men.
2	,,	,,	,,	,,	,,	,,
3	,,	,,	,,	,,	,,	,,
4	,,	...	,,	,,	,,	,,
5	...	...	...	,,	,,	...
6	...	...	...	,,	,,	...
7	...	...	...	...	,,	...
8	...	...	...	...	...	...
9	...	...	...	...	...	...
10	...	...	...	...	...	...
11	...	...	...	...	...	...
12	...	...	...	...	...	...
13	...	...	...	...	...	...
14	...	...	...	...	...	...
15	...	Senecio.	...	...	...	...
16	...	,,	...	...	...	...
17	...	,,	...	...	Senecio.	...
18	...	,,	...	...	,,	...
19	Senecio.	,,	...	...	,,	...
20	,,	Men.	...	...	Men.	...
21	,,	,,	...	Senecio.	,,	...
22	,,	,,	...	,,	,,	...
23	Men.	...	...	,,	,,	...
24	,,	...	Senecio.	Men.	...	Senecio.
25	,,	...	,,	,,	...	,,
26	...	...	Men.	,,	...	,,
27	...	...	,,	,,	...	Men.
28	...	...	,,	...	...	,,
29	Next men	struation ex	pected to be	gin this day	in each case.	
30	...	...	...	...	...	...
31	...	...	...	...	...	...

IV. *Cases of dysmenorrhœa.*—Senecio was also given in 4 cases of dysmenorrhœa, in which there was no organic disease of the reproductive organs, and in which numerous remedies had been tried with varying result.

Case 1.—E. L., æt. 23. Menstruation began at 14; irregular and painful. She is somewhat anæmic, complains of almost constant headache, and of severe pain a few hours before menstruation and during the first two days of the flow. She takes Tinct. senecio 1 drm. every two or three hours while pain continues, and states that it always gives relief.

Case 2.—A. Y., æt. 28. Menstruation began at 13, painful and irregular. Pain usually severe for four or five hours after the commencement of flow. Tinct. senecio was taken in two 1-drm. doses. Some nausea followed, and the pain was rather worse than usual.

CASE 3.—Mrs. R., æt. 32. Menstruation began at 14, regular; type thirty-one days, duration two days; considerable pain. Patient took Tinct. sen. 1 oz. in drm. doses, during a period, and expressed relief. She repeated the treatment at the next period, but has not since done so.

CASE 4.—Mrs. H., æt. 25. Menstruation began at 13; regular; type twenty-eight days; duration three days. Considerable pain first day. One ovary is tender, but not large. Patient took several 1-drm. doses of the tincture and expressed relief, but has not cared to repeat the treatment.

CONCLUSIONS.—The above experiments lead me to agree with Murrell that "senecio is not an ecbolic." I also agree with Murrell that the drug will not provoke menstruation in cases of marked anæmia or advanced phthisis, but will do so in cases of functional amenorrhœa. Murrell, however, judged that senecio increases the quantity of the discharge, while my own cases point to the opposite conclusion. The views of Bardet and Bolognesi are identical with my own on these points, though I differ from their views as to the mode of action of the drug. As to dysmenorrhœa, Murrell and Dalché and Heim found the drug useful in certain cases, while I am inclined to agree with Bardet and Bolognesi that it will not be found of much advantage for the relief of pain.

ACTION AND INDICATIONS.—A little thought on the physiology of menstruation will provide a working hypothesis for the action of senecio which is sufficiently reasonable to justify its use, and which also defines its indications.

A man, while his weight remains constant, elaborates from his food an amount of highly organised material exactly equal to the amount of similar material broken down by his activity and removed from his body by lungs, kidneys, and skin. Income and expenditure of protoplasm in the adult healthy male are equal—the anabolic changes balance the katabolic.

A woman, on the other hand, manufactures during her reproductive life highly organised material in a quantity larger than that needed for her individual use. Her protoplasmic income is greater than her protoplasmic expenditure from puberty to the menopause—her anabolic changes preponderate over the katabolic, and the balance is expressed as follows:—During pregnancy the anabolic surplus goes to form the fœtus, during lactation it supplies the milk, at other times it is lost at monthly intervals by hæmorrhage from the uterine mucosa. Before puberty and after the menopause, though female in structure woman is not reproductive in function; and the balance between the anabolic and katabolic changes that together constitute her metabolism is disturbed, as in man, only when weight is being gained or lost.[1] Thus we can see the physiological significance of a periodic sanguineous discharge from the uterine mucosa. With the evolution[1] of the function we are not here concerned, nor yet with the adaptation of the human ovum for implantation on a surface denuded of its epithelium by menstruation. It is necessary, however, to know what determines the particular time at which menstruation shall occur.

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[1] Geddes and Thomson, "Evolution of Sex," 1889, p. 245.

Congestion of the reproductive organs accompanying the rupture of an ovisac has, until recently, been thought to be the immediate cause of each menstrual flow. But we now know that ovulation can occur without menstruation, and that menstruation can go on without ovulation. The proofs of these statements are too well known to need recapitulation,[2] but two cases described by Bossi may be mentioned.[3] In one there was monthly bleeding from the anus in a patient who had no vagina, and in whom both ovaries and uterus were infantile. In the other case, a woman æt. 37, who had always menstruated regularly, became affected with too prolonged periods, during which the discharge was unduly large in amount. Hysterectomy was performed, and it was found that she had no ovaries nor tubes! The fact that the removal of both ovaries and tubes does not always cause cessation of the menstrual function, points to the conclusion that when Battey's or Tait's operation does cause a premature menopause, it is not through the removal of the organs, but by the division of certain nerves in the broad ligaments. This view has led to the formulation of the "nervous theory" of menstruation; and we now agree with Christopher Martin that the function is presided over by a special centre situated in the lumbar part of the cord, and that impulses to menstruate reach the uterus through the pelvic splanchnics or the ovarian plexus, or by both routes.

Thus menstruation expresses an anabolic surplus produced by the healthy human female from puberty to the menopause, its occurrence being determined as to time by the activity of a special centre. In the light of this view of menstruation, we see that substances like iron, which affect the quality or quantity of the blood, are only indirectly emmenagogues. Substances which, by causing renal or gastro-intestinal irritation, promote pelvic congestion and uterine hæmorrhage, should hardly be called emmenagogues at all. A true direct emmenagogue must act on the nervous mechanism which initiates menstruation, and this appears to be the mode of action of senecio.

Having thus cleared our ideas, we can now classify the commoner kinds of amenorrhœa in a way which shows which cases are suitable for direct treatment by an emmenagogue such as senecio.

1. Amenorrhœa due to congenital or acquired deficiency or absence of essential reproductive organs—no treatment.

2. Amenorrhœa due to local defects, such as atresia vaginæ,

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[1] Fothergill, "Manual of Midwifery," 1896, p. 31.

[2] *Ibid.*, p. 27.

[3] Bossi, *Ann. di ostet.*, Firenze, Sept. 1896.

atresia cervicis (congenital or acquired), neoplasms, etc.—surgical and other local treatment.

3. Amenorrhœa due to general disease, which so disturbs metabolism that the patient has no blood to spare, *e.g.* anæmia, phthisis—treatment by drugs and food, acting indirectly.

4. Functional amenorrhœa, due to want of activity of the nervous mechanism initiating menstruation. This includes—(*a*) cases in which the function has never been established, but where there is no general or local defect sufficient to account for its absence; also (*b*) cases in which menstruation is arrested by mental or physical shock, hope or fear of pregnancy, and other causes—treatment by a direct emmenagogue, such as senecio.

Chemical and pharmacological notes.—Several species of the genus which have been specially investigated are as follows:—

Senecio vulgaris } Two alkaloids—senecine and senecionine, in small
„ *Jacobæa* } quantities.
„ *aureus*, used in America.
„ *maritimus*, used in France.
„ *canicida*, Mexico; fatty acid, poisonous.
„ *Kœmpferi*, Java; fatty acid (Shimoyana).
„ *hieracifolius*, United States; resin and essential oil.
„ *erucæfolius*, alkaloids both present in some quantity.
„ *paludosus*, alkaloids in still greater quantity.
„ *gracilis*, known to herbalists.

Organic acids.—Shimoyana[1] found a new fatty acid in *S. Kœmpferi*, a Javanese species. It was named senecic acid ($C_6H_8O_2$), but is not necessarily identical with the fatty acid of the same name found in *S. canicida*, a Mexican poisonous species.[2] This latter is a colourless volatile liquid, whose salts are soluble in water; 20 cgrms. will kill a small dog in four to six hours. A phase of excitement is followed by a phase of depression; then convulsions occur—first clonic, later tetanic; finally, the reflexes are suppressed, and heart and respiration are arrested (Guillouet[3] and Toussaint[4]). In spite of the convulsive action of its acid, *S. canicida* has been recommended in epilepsy by Mexican physicians.

Resins and essential oils.—Senecin is the brown resinous substance derived from *S. Jacobæa* and other species. It was used by Murrell, and was believed by him to contain an active principle of the plant. It is probably a mixture. A resin and an essential oil have been obtained from *S. hieracifolius* (syn.

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[1] "Senecio Kœmpferi," *Pharm. Ztg.*, 1893, S. 68.

[2] Sessé y Monico, "Flora Mexicana," 1895, p. 185.

[3] "Des effets toxique du senecio canicida," Thèse, Paris, 1883.

[4] "Senecio canicida," *El Estudio semanario di Ciencias medicas*, Mexico, 1891, tome iv. pp. 5–199.

Erechtites), a species found in the United States (Todd and Lloyd).[1]

Alkaloids.—Senecionine ($C_{18}H_{25}AzO_6$) and senecine are two alkaloids isolated by Grandval and Lajoux.[2] They are bitter bodies, whose salts are soluble in water, and are found in very small quantities in *S. vulgaris* and *S. Jacobæa*, but in slightly larger proportion in *S. erucæfolius* and *S. paludosus.*

The alkaloids exist only in the subterranean parts of the plants. As the difficulty of obtaining them in any quantity has prevented hitherto their use for clinical experiments, Dalché and Heim propose making separate liquid extracts of the aerial and of the subterranean portions of the plants, experiments with which will decide whether the emmenagogue action is due to the alkaloids or to some other active principle. But if Lutz[3] is correct in stating that the alkaloids are found in the root alone, the emmenagogue action cannot be due to them; for my liquid extract, which is certainly active, is made from the aerial portion of the plant alone, and therefore should not contain alkaloids. I therefore think with Murrell that the resinous "senecin" contains the emmenagogue principle.

Wiet[4] found, by experiment on frogs and guinea-pigs, that chlorohydrate of senecionine destroys the excitability of motor nerves, but leaves intact the irritability of muscle itself. In sufficiently large dose it is a curariform poison. Its effect on sensory nerves remains doubtful. It slows the heart's action, and in fatal doses stops the organ in systole.

THE CRANIUM OF THE INSANE: OSTEITIS DEFORMANS AND ACROMEGALY.

By CECIL F. BEADLES, M.R.C.S., *Assistant Medical Officer, County Asylum, Colney Hatch, London.*

(*Concluded from page* 401.)

IN striking contrast to the thickened cranium of osteitis deformans is a calvaria from a case of acromegaly. Fig. 4, taken from a photograph, shows the inner table. This specimen very fortunately had been saved from a case of acromegaly that died in Colney Hatch Asylum during the year 1885, a date antecedent to Marie's classical paper,[5] in which he first describes and names this singular disease. That the case was one of true acromegaly there can be no doubt, from the very careful clinical description and post-mortem notes made at the time by Dr. Robert Jones, then medical officer here, and now superintendent at Claybury Asylum. These notes I have already published,[1] on account of a cystic adenomatous hypertrophy of the pituitary body that was found, but the appearance of the calvaria has not before been figured or adequately described. I will merely reiterate a few of the more salient points of the case.

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[1] *Jahresb. ü. d. Fortschr. d. Pharmacog.*, Gottingen, 1887, S. 63.

[2] *Journ. de pharm. et chim.*, Paris, 1895, Sér. 6, tome ii. p. 15.

[3] Lutz, *Bull. Soc. bot. de France*, 26th July, 1895, tome ii. p. 486, and 22nd Nov., p. 618; "Mat. Med. Mexicana," 1895, p. 119.

[4] *Union méd. du nord-est*, Reims, 1895, p. 217.

[5] *Rev. de méd.*, Paris, Avril 1886.

CASE 1. *Acromegaly.*—Female, 8948, æt. 40; died 26th September 1885, having been an inmate of Colney Hatch Asylum since February 1884. At the time of admission she is described as being a huge, bony woman, with a lowly organised head, large zygomatic processes, prominent superciliary ridges, and receding forehead. Ears and lower jaw immense. Hands large and spade-like, and feet enormous, these having been noticeably increased in size for sixteen years. There was paresis of the lower limbs. She was dull and drowsy, complained of headache, and had aural and visual hallucinations. It was observed that in some respects she resembled a case of myxœdema,[2] but differences from that disease were pointed out. While she lived she slept a great deal, had rheumatic pains, and several attacks of hæmorrhage from the rectum and stomach. Death followed severe hæmatemesis.

As a result of the autopsy, it appeared that the bleeding arose from capillary congestion of the mucous-membrane of the stomach. Most of the organs of the body showed signs of degeneration and disease. The lungs were congested, the left adherent and surrounded by a false membrane, the result of old pleurisy. Kidneys and spleen greatly enlarged, the latter weighed 20½ oz. There was no tubercular or malignant disease in the body. The thyroid was hypertrophied. The body was very obese, and had an enormous bony skeleton. It was found that the pituitary body had been converted into a large cystic tumour, which displaced the neighbouring structures at the base of the brain and caused absorption of the bone of the skull, so as to leave a cavity in the sella turcica as large as a small hen's egg.

The calvaria, which has been removed in the usual manner, appears shallow and of small size; the bones entering into it are unevenly thinned, in some places to such an extent as to be quite translucent; this is more particularly the case in the anterior part, and at the larger meningeal grooves (Fig. 4). In both parietal regions there are a few places where the bone reaches $\frac{2}{16}$ or $\frac{3}{16}$ of an inch, but between these areas, and wholly in front of the middle meningeal grooves, the bone is less than $\frac{1}{16}$ in. in thickness. As one passes back the bone tends to become thicker, so that at the oblique line of section (in this case vertical) the bone is a little over ¼ in. thick. In the thinned parts no diploe exists, in the thicker and hinder part the whole width seems composed of finely porous cancellous tissue. The inner table is profusely dotted over with small pits and foramina, and the grooves for the branches of the meningeal artery are extremely shallow. The coronal and sagittal sutures are distinct, linear on the inside, and markedly dentated on the outer. Growing from the inner table of the frontal bone are a number of small, dense, bony outgrowths, of the nature of exostoses.

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[1] "A Further Contribution to the Study of the Pathology of the Hypophysis Cerebri," *Journ. Path. and Bacteriol.*, Edin. and London, February 1893.

[2] The Clinical Society's report on this disease appeared in 1888.

Viewing the vault of the skull as a whole, it is seen to be very shallow. The highest point, which is only 1 in. behind the bregma, is scarcely 2 in. above the line of section. The outline is a roundish oval, the frontal portion being wider in proportion to the parietal and hinder part than is natural; and the depression occurring behind the temporal crest of the frontal bone does not make its mark on the cranial cavity, as is usually the case. The greatest breadth of the skull-cap is 5 in. externally, 4¾ in. internally. The breadth at the site of the main meningeal groove is 4⅝ in. externally, and something between 4½ and 4⅝ in. internally; the length may be estimated at between 7 and 7½ in. externally, and 6 to 6¼ in. internally, an inch of the difference being due to the space occupied by the frontal sinuses. This would give us a circumference of 20½ in.

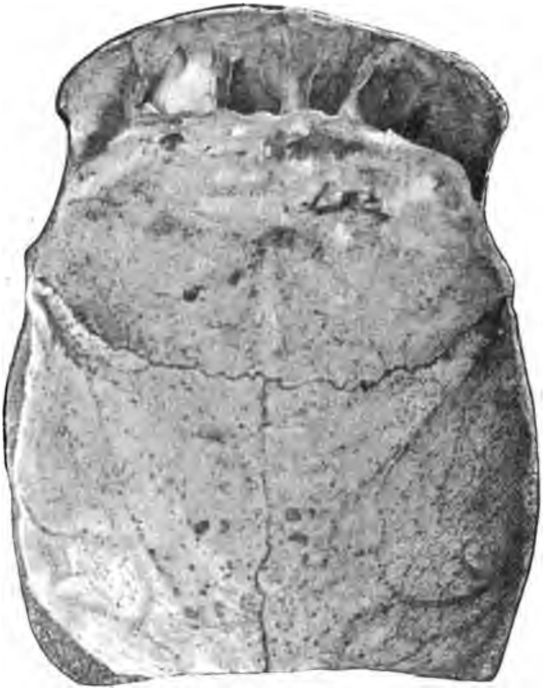

FIG. 4.

The frontal bone presents the most peculiar changes. The bone forming the forehead is very depressed and receding, there being no frontal eminences; it slopes gradually upwards and backwards to the coronal suture, where it is raised above the level of the adjacent parietal bone. The temporal crest on this bone stands out prominently, giving a broad square contour to the forehead. The slope of the forehead, and the side view in general presented by this calvaria, more resembles the frontal region of the normal skull of an Australian aborigine, or that of one of the higher apes, than of a European (Plate XIV., Fig. 2). This peculiar appearance is produced by an enormous distension of the frontal sinuses. For a width of 4 in. across, the outer and inner tables of the frontal bone are separated from one another by a distance of 1 in. (Plate XIII., Fig. 1). Both the bony plates are exceedingly thin and translucent. The sinuses extend up into the bone towards the vertex for a distance of 2½ in. from the line of section, and reach to within 1½ in. of the coronal suture. The cavity thus formed is bridged across by thin laminæ of bone, almost papery in consistency. The weight of the dry skull-cap is only 5 oz.

In looking over the recorded cases of acromegaly, one is struck by the fact that a prominence of the superciliary ridges appears to be almost as constant a feature of the disease as enlargement of the lower jaw. In some it is noted, in addition, that the forehead was low and receding, but in a few instances this was large and prominent. Of the fairly numerous cases now published, or brought before the medical societies of the kingdom, comparatively few have been examined after death. A description of probably less than forty fatal cases could be found in medical literature throughout Europe and America.[1] Of these, again, only a portion enter into details. I have been able to find very few in which reference is made to the condition of the frontal sinuses. It appears to be generally believed that a dilatation of the air sinuses in the skull is the usual condition present in acromegaly; this has probably arisen from the fact that in the earlier cases recorded abroad, distinct enlargement of these sinuses was found, but cases published in this country do not entirely support this suggestion. In some instances where the skull has been examined, there has been described a certain amount of distension of the frontal sinuses, evidently to a moderate degree, and nowhere approaching the condition of the specimen figured above. Moreover, it seems invariably to have been associated with an increased thickening of the diploe of the cranial bones, which seems largely to have accounted for the abnormal prominence of the superciliary ridges. In other cases, again, there appears to have been an entire obliteration of the frontal sinuses by cancellous bony growth. Evidence distinctly negatives a point laid stress upon by Broca,[2] that dilatation of the mastoid, sphenoidal, and maxillary sinuses is also a feature of the disease.

I have failed to find a single reference to a case of acromegaly

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[1] At the Pathological Society, on November 2nd, 1897, Furnivall gave a summary of thirty-three post-mortem examinations. This was obviously not an entire list of recorded cases.

[2] *Arch. gén. de méd.*, Paris, December 1888.

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where thinning of the cranium was present. They all appear to have been hypertrophied to a moderate extent by an increased thickening of the cancellous tissue, with perhaps thinning of the compact bone on either side.[1] The thickening is universal over the whole skull, and may reach a width of ½ in. in its widest parts, but seldom more. The result is that the calvaria does not differ greatly from that of osteitis deformans in its general appearance. Mr. Furnivall showed such a calvaria at the Pathological Society of London; it presented no indication of frontal sinuses; the cranial bones were slightly porous, without distinction of inner and outer table.

On the other hand, in the excellent description of a skeleton from acromegaly, given by Alexis Thomson,[2] the sinuses were said to be considerably dilated, though they remained distinctly separated on the two sides. The left was the largest, and measured 1⅜ in. horizontally and 1¾ in. in a vertical direction; further, the bone anterior to the cavities was thickened, and around the entire cranium it varied from ¼ in. to ½ in. Except for the last point, this skull more resembles the one I have described than any with which I am acquainted. It was from a man, æt. 36; the greatest length was 7⅞ in.; greatest breadth, 5¾ in.; circumference, 22⅞ in. The anterior fossa was shallower than normal; this must have been markedly so in my case. It differed, however, in the hypertrophy of the bone, the obliteration of the sutures, and the deepening of the meningeal grooves. Thomson believes one of the distinguishing points in this skull and a skull of osteitis deformans is, that in the former the inner and outer tables of compact bone are retained, but cases published since prove that this is not invariably the case. In a female, trephined during life by Thomas,[3] "the cranial vault was much thickened and softer than normal, the inner and outer plates were very thin, and the intervening diploe was coarsely cancellous and very vascular."

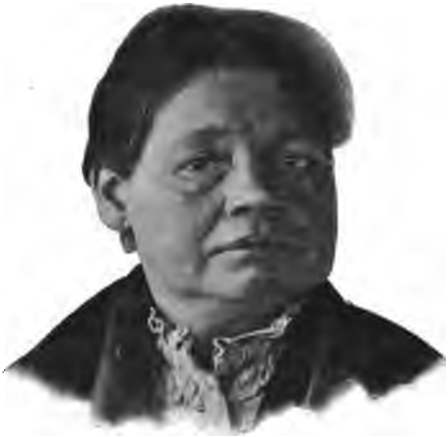

FIG. 5.

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[1] The same is true of pulmonary hypertrophic osteo-arthropathy. Thorburn and Westmacott have recorded a case where the bones were thickened but sclerosed, *Trans. Path. Soc. London*, 1896, p. 181.

[2] *Journ. Anat. and Physiol.*, London, 1890, vol. xxiv.

[3] "Satisfactory Palliative Treatment of a Case of Acromegaly," *Brit. Med. Journ.*, London, 1896, vol. i. p. 909.

Amongst the large number of individuals entered in the books of this asylum, during the forty-five years it has been opened, I have only been able to discover one more instance of what would appear to be acromegaly. This was a female only recently here, and whose residence was of short duration. No suggestion is made in the case-book of this disease by the medical officer who entered up the case at the time, but my colleague Dr. Ewart, who saw the patient, says that her appearance strongly suggested an early case of acromegaly, and his statement is borne out by the accompanying portrait taken on admission (Fig. 5).

Case 2. *Acromegaly.*—Female, 12,465, æt. 40; admitted 21st Sept. 1895; was brought from Paddington workhouse; no details were known as to the cause and duration of the attack. She was said to be single, and a cook. On admission she was well nourished, weighing 10 st. 13 lb. Her face presented a bloated and congested appearance, as though she had been a free drinker. Head large, hair dark brown, pupils equal, with reaction somewhat sluggish; cardiac action intermittent, ceasing every fourth beat; respiration normal, temperature 98·4; no form of paralysis present. Mentally she was dull and apathetic, and in a condition bordering on dementia, with a suggestion of general paralysis of the insane. Her memory was defective, she was confused in her ideas, and unable to give a lucid account of recent events, no idea of time or place, and she had delusions and visual hallucinations. During her residence in the asylum she brightened up to some extent, and was employed in the laundry. She is said to have suffered from rheumatic pains; her hands and feet were large and deformed, it was thought from chronic rheumatism. She was transferred in March of the following year to Brentwood Asylum.

The accompanying photograph of this patient contrasts well with the one given in a former part of this paper of a case of osteitis deformans, but it must be remembered that in this case the disease is evidently in an early stage of its existence, whereas in the other it is in an exceedingly advanced condition. The first point, perhaps, which most obviously strikes the eye in looking at a full-face portrait, is that whereas in osteitis deformans we have a peg-top configuration, in acromegaly the face has a squarish outline. This difference is due to the fact that in the first disease there is hypertrophy of the upper part of the head, most marked at the cranial vault; in the latter, the hypertrophy is in the lower part of the face, more particularly the lower jaw. The angles of the inferior maxilla stand out prominently and largely.

In the present case there does not appear to be any enlargement or prominence of the bone at the chin, and the lower lip does not seem increased in size. The upper lip, however, is very broad, and it is probable that the alveolar border of the upper jaw was also enlarged. There seems to be slight hypertrophy of the whole superior maxillæ. The skin has a rough, coarse appearance, and the lower eyelids are swollen; hair is plentiful on the head; the nose is broadened, and the alæ are wide apart; the neck appears thickened. It is difficult to say if any change has taken place in the ears. The general appearance presented by the photograph gives one the impression that the woman was of an exceedingly low congenital type, with her mental faculties equally undeveloped; but the unfortunate development of the lower jaw, through disease, possibly causes her appearance to belie her true nature.

Dr. John Turner, who now has her under his care, has kindly forwarded to me a photograph taken in July 1896. In this she seems to have a large head, with a swollen oval-shaped face; the angles of the lower jaw do not stand out to the same extent as in the first portrait, possibly due to the position of the head. She seems to have lost a good deal of the coarse, low type of expression; doubtless the prohibition of all forms of alcohol, the feeding, and regular life coincident with life in an asylum, has played some part in this result. The general aspect of the patient suggests rather more that of myxœdema. The face has an œdematous look, the lower eyelids are more swollen, the whole nose broadened, the chin large. A view of the left ear reveals distinct enlargement. Both hands are taken in the photograph, and are seen to be slightly enlarged and spade-like. Dr. Turner informs me that the patient appears in very fair health, she sits reading all day, is morose and taciturn. She believes herself that her hands get bigger, but the change is scarcely noticeable. There are no symptoms at the present time pointing to a lesion of the pituitary body. It will be exceedingly interesting to watch the progress of this case, and it is mainly for that reason that I have given these details.

Judging by the recorded instances, both acromegaly and osteitis deformans would seem to be rare diseases in asylums. In both these diseases great headache and severe pain in the head have been prominent symptoms. In published cases ocular symptoms have almost invariably been present, at least when the disease has been advanced. Towards the close of life we usually find mental dulness, depression, and finally dementia, but either these have not been sufficiently pronounced or prolonged; or, it may be, the physician in charge has wished to keep the case under his personal observation, so that they do not find their way into asylums for the insane. On the other hand, seeing that both these diseases exist for many years (ten, twenty, or more), and the onset and growth passes almost unnoticed, it is quite possible the disease may arise or be recognisable after a patient has long been resident in an asylum.

I have found reference to no case of osteitis deformans, and only one or two of acromegaly, that were inmates of a lunatic asylum. One was a woman in the Lancaster Asylum, reported by

Shiach.[1] At the time of writing she was 36 years of age and still living. Besides marked changes in the jaw, nose, hands, and feet, she had a low, retreating forehead, with thickening of the superciliary ridges, severe pain in the head, but no ocular symptoms; her mental state was melancholia with delusions. There was also deformity of the spine and sternum, and thickening of the ribs and clavicles. Another woman, æt. 37, was confined in an Italian asylum, on account of delusions of suspicion and acts of violence. A detailed account of the post-mortem appearances is given by Tamburini.[2]

Throughout the asylums of the kingdom there is in existence a very large collection of post mortem records. Now that the characteristic features of the allied group of diseases—osteitis deformans, acromegaly, hypertrophic pulmonary osteo-arthropathy, and myxœdema—are more thoroughly known, it would be exceedingly interesting to have the autopsy books searched, and the result made known. I am fairly convinced myself that cases would be found. Very probably some of the cases described as hyperostosis of the skull would prove to belong to one or other of these diseases. The main drawback to such a search would unfortunately be the scantiness of the information supplied.

ON THE TREATMENT OF SOME OF THE MORE COMMON EYE AFFECTIONS.

By G. A. Berry, M.B., F.R.C.S.Ed., *University Lecturer on Ophthalmology; Ophthalmic Surgeon, Royal Infirmary, Edinburgh.*

(*Continued from page* 366.)

Foreign bodies are frequently lodged on or in the cornea. A great deal of harm may be done if they are not removed early, or if proper care is not taken in removing them. At all large factories and workshops where the men are liable to get metal filings or other chips or sparks, popularly known as "fires," from red-hot metal, into their eyes, there are some amongst the workmen who have acquired considerable skill in removing such foreign bodies. Unfortunately, however, the instruments which they use for this purpose are not generally particularly suitable, or kept in a manner commensurate with the skill with which they are employed. They are in fact far from clean, as a rule, in a surgical sense, and consequently, especially where the cornea is picked at for some time before the foreign body is dislodged, it is apt to be infected and become ulcerated.

The first point, then, to attend to in removing bodies from the cornea is to use an aseptic instrument. To neglect this precaution is, morally speaking, criminal. The best form of instrument to use is a corneal spud, either smooth or, preferably, grooved. But any sharp-pointed knife will do, and in the case of deep-lying foreign bodies may even be more suitable.

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[1] *Lancet*, London, 1893, vol. ii. p. 369.

[2] *Riv. sper. di freniat.*, Reggio-Emilia, 1894, p. 559, and 1895, p. 414.

Another point to be attended to is to take care to avoid scraping away any more of the corneal epithelium than necessary. The spud or other instrument must, of course, be dug in as far as is required to remove the foreign body. But one's attention must be confined to the one place at which the body is lodged. Too much scraping about in the vicinity must be avoided. To work with the least risk of unnecessary scraping, the patient's head and eye must be properly fixed. The best way to do this is to seat him on a chair facing a good light, or, if the operation is performed after dark, in such a way that an assistant is able with a convex lens to concentrate a beam of candle or gas light on the cornea. Then, standing behind him with his head leaning against the operator's chest, the lids are held apart with the fore and middle fingers of the left hand. These fingers should be pressed against the *margins* of the lids, otherwise it is not possible to counteract properly any efforts that the patient may make to close his eye. At the same time, by slight pressure of their points on the globe itself, above and below the cornea, one may sufficiently control its movements. Cocaine renders it possible to remove foreign bodies without causing pain, and also generally ensures steadiness on the part of the patient, so that it is seldom that any particular skill is required in the operator to enable him to confine his attention to the foreign body, and not wound any other part of the cornea. The main difficulties, when the precautions mentioned have been taken, are associated with the removal of deep-lying bodies. Sharp, irregularly-shaped small pieces of stone or metal often lie deeply embedded, and in a track which passes obliquely into the corneal substance. There is some danger of pushing such bodies through into the anterior chamber. A sharp-cutting fine knife or needle should be used to open up the track well before any attempt is made to push a spud in behind the body.

The subsequent treatment of a case in which a foreign body has been removed from the cornea, should depend upon the depth and appearance of the wound which is left. In the majority of cases, taken in time, all that is required is to keep the eye clean with boracic acid lotion for twenty-four hours. Other cases may have to be treated on the lines already laid down in connection with corneal wounds.

INFLAMMATION OF THE IRIS.—The iris is not only relatively frequently inflamed, but serious harm is apt to result if an iritis be left to take its own course or receive improper treatment. For these reasons, the diagnosis is a matter of great practical importance.

In all cases in which the white of the eye is congested, the very first question to be considered is as to whether or not this indicates the presence of either an already established or a threatened attack of inflammation of the iris. In this respect it should be remembered that it is better to err on the safe side and begin to treat as for iritis, even when it does not exist, than to overlook its presence and adopt unsuitable treatment.

A careful examination, especially of the distribution of the hyperæmic area, the transparency of the aqueous humour, and the lustre or glossiness of the surface of the iris, should seldom fail to lead to a correct diagnosis in the first stages of an iritis. Later on, the irregularity in the shape of the pupil, or its immobility, and the greater or less defect of vision, render the diagnosis easy. It is, however, in the early stage that it is perhaps most important no mistake should be made. This stage, too, more frequently comes under the observation of the family physician than of the ophthalmic surgeon. He it is who will have in many cases to distinguish between the symptoms of a superficial inflammation and a deep, such as iritis; and should he find the diagnosis difficult, it will be better for his patient if he is not allowed to run the risk of delay in adopting a treatment by which the evil effects of iritis may be kept off. A false alarm in this respect is preferable to a neglected opportunity.

The only other condition besides superficial inflammation of the eye, with which there might possibly be a difficulty as to differential diagnosis, is glaucoma. It is important to bear this in mind, as glaucoma is also a condition for which neglect of proper treatment may do harm, and which in the congestive form may present appearances not unlike those of iritis. The age of the patient, the previous history of "halos" and obscurations, the condition of the field of vision, and above all the peculiar stippled and steamy appearance of the cornea, would point more or less definitely to glaucoma. A necessary rider, therefore, to the somewhat rule-of-thumb advice to treat for iritis, when a congested state of the eye left one in doubt as to the origin of the congestion, would be to make sure before doing so that there is no glaucoma.

One way in which the congestion of the white of the eye which is indicative of deep-seated inflammation, differs from that associated with conjunctivitis only, is in its distribution. In both cases there may be more or less redness of the whole of the white of the eye, but whereas, as mentioned in connection with conjunctivitis, the redness in that case diminishes in intensity from the periphery to the cornea, it is just the opposite with a deep congestion. More especially, then, when one sees a dense injection of fine vessels surrounding the cornea, must one's attention be directed towards the existence of deeper mischief. Of course, in any such case the cornea itself would be carefully inspected and, in the absence of any abnormality there, the cause of the circumcorneal injection looked for in the deeper structures of the eye.

Hyperæmia of the iris itself causes, according to its degree and the original colour of the iris, more or less appreciable change in that colour. Light irides show slight changes in vascularity more readily than dark. Where there is any circumcorneal injection then in one eye only, a careful comparison should be made, in a good light, of the two irides. Any difference that there may be in respect to their colour, and due to congestion, is always most apparent in the areas immediately surrounding the pupil. As soon as the engorged vessels of the iris begin to transude, the serous surface loses its beautiful gloss and becomes dulled. A difference in this respect also should therefore always be looked for, where there is any reason to suspect inflammation of the iris.

Pain is not always present in iritis, and therefore, although it is, from the point of view of treatment, an important element to consider, it is of comparatively little value in diagnosis. Still, where with other appearances of iritis there were found to be localised spots of tenderness on pressure on the eye, and a history of severe nocturnal exacerbations of spontaneous pain, these symptoms would be useful in further helping to establish or confirm the diagnosis.

Whilst, then, with proper care there should usually be little difficulty in diagnosing iritis, the further diagnosis of the cause of the localised inflammation is often by no means an easy matter. Fortunately, however, the treatment is only to a certain extent influenced by the correct diagnosis of the cause. The most essential points in the treatment apply, in fact, to all forms of iritis. Unquestionably the most important thing to do in all cases is to secure and to maintain, as long as the inflammation lasts, a thorough dilatation of the pupil. If a case of iritis be left to take its own course, or treated without the use of a mydriatic, it almost invariably happens that adhesions (synechiæ) form between the posterior surface of the iris and the anterior capsule of the lens. Sometimes, indeed, when there is much fibrinous exudation from the inflamed iris, some of it may become organised into a membrane stretching across and more or less completely occluding the pupil. The risk of this happening is all the greater, owing to the tendency that there always is for the pupil to be contracted when the iris is inflamed.

Synechiæ alone, though they do not cause any direct impairment of vision, are always an undesirable complication. They often, fortunately, only form to such an extent as to tie the iris down at certain points without causing any continuous adhesion between the two surfaces. This, while in itself of little consequence, is a state of matters which increases the risk that the eye runs from every subsequent attack of iritis. The possibility of recurrence, too, should always be kept in mind. Some varieties of iritis are very apt to recur. It has even been supposed that the existence of the synechiæ was an important factor in determining the recurrence. The stretching of the iris caused by dragging on the adhesions, as the pupil tends to dilate and contract under the various influences almost constantly at play, has been looked upon as possibly causing sufficient mechanical irritation to lead to inflammation. This view is, I think, hardly sufficiently probable to serve as a guide to treatment. At all events, no attempt to detach such posterior synechiæ, when they are of sufficiently old standing to have become regularly organised, should be made. The only thing that may be justifiable, and as to the indications for which I shall have to say more presently, is to perform an iridectomy. Fortunately, when synechiæ are ruptured during the excision of a piece of iris in this operation, it is extremely rare to find that their attachment to the lens capsule is sufficiently firm to lead to any laceration of that membrane. Practically speaking, this never occurs. If it did, the risk of iridectomy causing cataract would be very much greater than it actually is, and the great benefits which are derived from surgical interference in cases of neglected iritis would be seriously curtailed.

Whilst, however, the supposed influence is causing recurrence which has been ascribed to synechiæ need not be considered, it does not follow that a more or less constant drag on these adhesions has never, under any circumstances, an irritative effect upon the iris. The conditions in this respect are undoubtedly quite different when we compare the cases where there exists at the time an inflammation of the iris with those in which the iritis has long since subsided. It is a very common error to suppose that because it is in general desirable to use atropine or some other mydriatic during the whole course of an attack of iritis, it is always right to do so. I have, in many instances, by advising the discontinuance of atropine, where the patient's medical attendant has been using it freely, seen a very rapid improvement take place. The reason of this is that, as the main call for a mydriatic is, as just explained, to produce dilatation and thus prevent synechiæ, the *raison d'être* of such treatment is absent when, the mydriatic having been begun too late, the pupil cannot be properly dilated. A dragging to no purpose on the already firm synechiæ with the iris inflamed may do harm. It certainly tends to irritate and to keep up the inflammation. As, too, the continuance of the inflammation means often the exudation of more and more plastic matter, the consequences may be more serious than if the patient were left without any treatment at all. A practical guide in this respect may be formulated as follows:—If the free use of the mydriatic (applied, *i.e.*, three or four times in the twenty-four hours) for three or four days in any case of iritis, seen or recognised only some time after it has begun, fails to cause any satisfactory dilatation of the pupil, it should be discontinued.

Another practical point connected with the use of atropine in iritis, and one as to which the proper course to take is often a matter of no little difficulty, is the possibility of the treatment leading to increased intra-ocular tension. In elderly people especially, it is important always to be on the lookout for this complication. Should it arise, the first thing to be done is to stop the atropine. If the tension is then soon restored to normal, it may be resumed before the pupil has become quite small. It must then, however, be used with caution, and not so free a dilatation aimed at. The best thing to do is to diminish both the frequency of the applications and the strength of the mydriatic solution. A ¼ per cent. solution of atropine, used once every second day, should be tried; or homatropine solution of the same strength may be substituted for the atropine. Where the glaucomatous symptoms persist, or return with the use of even a weak mydriatic, a sclerotomy, done in the manner to be afterwards described, is in some cases useful. The cases in which sclerotomy may be resorted to are the cases of serous irido-cyclitis; cases in which the inflammatory symptoms are less pronounced, and pain either not at all complained of, or, comparatively speaking, slight. In more violent plastic iritis, any operation at the time of the inflammation is, in my opinion, contra-indicated. Mydriatics must be altogether given up, and surgical treatment deferred until after recovery. If anything then seems advisable, an iridectomy is generally to be preferred to sclerotomy.

In addition to keeping the pupil dilated, whenever this is possible, it is important, in all cases of iritis, to keep the eyes shaded from the light. This may either be done by darkening the room or by the use of dark glasses (neutral-tinted or "smoked" glass, not blue). If the patient is able to be up, the latter is preferable. He can then occupy the same rooms as, and enjoy the society of, other inmates of the house. Both eyes must be shaded in this way. It is useless to cover the inflamed one with a handkerchief or bandage, as is often done, and leave the other one exposed to the untempered and constantly changing light of an ordinary room.

During an attack of iritis, any use of the eyes for reading or sewing, or work of any kind calling for accommodation, must be prohibited. If there be any difficulty in enforcing this, it is a good plan to drop an occasional drop of atropine into the good eye, which, by paralysing the ciliary muscle, makes reading difficult or impossible without convex glasses, unless there be a sufficiently high degree of myopia. Even in myopic patients, although the accommodative effort made on reading is not nearly so great, it is better not to allow it.

In many cases, and particularly those of a rheumatic origin, the pain which accompanies inflammation of the iris is often so great as to call for special treatment. The pain may be more or less relieved by both local applications and drugs taken internally. It is particularly aggravated by light and by cold. Where it is intense, therefore, it is best to keep the patient in semi-darkness and in bed in a room in which the temperature is kept equable and protection made against draughts. Generally, the pain is most severe during the night, especially from midnight to four or five o'clock in the morning. Leeching (either with the natural or artificial leech) used to be a very common treatment for painful iritis. No doubt leeches applied to the temple have often a very marked effect in dispelling the pain. Their effect is, however, only temporary, and is in no way superior to less troublesome means of producing relief. They do not influence in any way the course of the inflammation. In my own practice I have long since given up leeching, and rely entirely upon hot fomentations. The fomentations may be used for a quarter of an hour at a time, every two hours or oftener, at the times when the pain is most severe. After using the fomentations, the eye may be covered with a pad of cotton-wool, retained by a loose bandage. Cocaine dropped into the eye immediately before fomenting sometimes helps, but it should only be used in cases where the pupil has dilated well under atropine. Of drugs, antipyrin in 10-gr. doses, or antifebrin in 5-gr. doses, twice or thrice daily, and salicin, are the most generally useful in relieving pain. In some cases salicin seems even to have the effect of cutting short an attack of iritis. It should be used from the beginning, being given in 7- or 8-gr. doses every hour for ten or twelve hours, or until toxic effects are manifested; then thrice daily in 10- or 15-gr. doses.

In purely rheumatic cases, salicin, in addition to the local treatment described, is the best thing to use, altogether independently of the matter of pain. Rheumatic iritis is not necessarily a condition affecting only those who exhibit a marked rheumatic diathesis. All acute cases in which the inflammation has followed exposure to cold, or in which a distinct chill has followed upon overheating, and in which at the same time there is no other more or less obvious cause, such as recent syphilis, gonorrhœa, malarial or other fever, may be referred to this category. Iritis from exposure to cold, either in distinctively rheumatic subjects or in others, is by far the most common variety. Markedly recurrent cases of iritis are mostly met with where there is a true rheumatic or gouty diathesis.

In the treatment of syphilitic iritis it is well to begin mercury at once. Of the different ways of giving mercury, I have personally had most experience of inunctions. The mercurial ointment should be rubbed well into the skin of the axillæ or inner side of the thigh for fifteen to twenty minutes once daily, and this continued for at least a month. A daily painting of the gums with a little tincture of myrrh, and frequent brushing of the teeth (not less than four times daily) with Condy's fluid will almost invariably keep away any complication with stomatitis. But, of

course, patients have to be carefully watched during this treatment, more especially as they have frequently already undergone mercurial treatment, though usually a very inefficient form of such treatment, before the onset of the iris inflammation. What I have seen, at the hands of French surgeons, of intra-muscular injections of the biniodide in syphilitic eye affections generally, has led me to regard that method as a sufficiently efficient way of using mercury. I have, however, no personal experience of it, nor do I believe that, although more cleanly and perhaps less troublesome, it is in all respects quite as satisfactory as inunction. I should, however, certainly give it the preference over either internal administration or subcutaneous injection. Subconjunctival injection, so far as my experience goes, is also not to be recommended, at all events in iritis.

One practical point of some importance, as it necessarily influences the treatment which one adopts, is the question as to the diagnosis of syphilitic iritis. In many—in fact in most—cases of iritis from this cause, there is nothing in the local appearances of the inflamed iris to point to its syphilitic origin. Owing to the frequency of rheumatic iritis and to the possibility of the resisting power of a syphilitic individual being no doubt more or less reduced, one may often have to ask one's-self whether the mere fact of an individual who has at one time acquired syphilis, having an inflammation of the iris, is sufficient to justify the diagnosis of syphilitic iritis? There certainly seems to me to be too great a tendency in many quarters to ascribe an iritis to direct syphilitic causation, wherever there is a syphilitic history, or even a reasonable suspicion of such a history.

The undoubtedly syphilitic forms of iritis are met with in two varieties. In the first, one or more nodular elevations make their appearance on the surface of the inflamed iris, and increase pretty rapidly in size, becoming yellow at first, and later on, owing to vascularisation, assuming more of a rusty-coloured tint, and then slowly becoming absorbed with the disappearance of the other inflammatory symptoms, and leaving very little trace, it may be only a slightly discoloured patch, to indicate the spot which they occupied. This is the so-called *gummatous iritis*. It occurs within the first year after the primary infection, and is usually confined to the one eye. The whole clinical appearance and course of this affection suggests the actual transference of syphilitic matter to the iris tissue. In the other variety of syphilitic iritis, there is nothing essentially peculiar in the local inflammation itself. There are, however, practically always at the same time, or there have been shortly before its appearance, other manifestations of secondary syphilis, and a history, or at all events definite indications, of a recent primary sore. This variety is mostly, indeed probably almost invariably, bilateral.

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Another of the common varieties of iritis which should be recognised on account of calling for special treatment, is that which usually goes by the name of *serous iritis*. More correctly, the condition is one of serous irido-cyclitis, as the ciliary body is always inflamed at the same time, and a more or less copious, more or less dense, exudation poured out from its processes into the anterior portion of the vitreous.

The slow, insidious, and painless course of this affection brings it often relatively late under the observation of the medical attendant. Frequently, too, he may fail to recognise it, owing to the but slight apparent inflammatory symptoms which may accompany it. In either case, a good deal of harm may be done by the formation of synechiæ before proper treatment is adopted. The symptoms to the patient are mostly, gradually, it may be very slowly, increasing haziness or cloudiness of vision, with a corresponding decrease of acuity. When such symptoms are complained of, especially if the patient be a young or middle-aged woman, and more or less anæmic, a careful inspection of the affected eye should be made. There will then often be found to be a slight haze of the lower part of the cornea, which, on closer examination, can be made out to consist mainly of a number of small spots, which have the appearance of being very deeply placed in the cornea. These spots are, in fact, deposits lying on its posterior surface. There will also be noticed some degree, often slight and partial, of circumcorneal injection. The pupil, too, is sluggish, and only capable of being irregularly dilated by atropine, owing to the presence of synechiæ.

In the treatment of this form of iritis, attention has always to be particularly directed to the state of the general health. The condition is one which is always indicative of some kind of malnutrition, or auto-infection. It is very much more frequent in women than in men. This does not seem to be due to association with any special female disorder, but is probably more connected with anæmia, with a sedentary habit generally, and with constipation. It is sometimes associated with malaria, and with the sequelæ of different fevers. Often, it must be confessed, the cause is doubtful, or altogether obscure. The duration, too, of a serous irido-cyclitis is longer, often very much longer, than of other forms of iritis, with the exception of sympathetic irido-cyclitis. The absence of pain, or of any tendency to aggravation from cold, render it unnecessary to take the same precautions to keep the patient's surroundings at an equable temperature. Indeed, in most cases, open air and moderate exercise is desirable, especially in summer. Proper regulation of the action of the bowels should never be neglected, and iron in some form given. In my own practice I have found the natural iron waters, such as Flitwick or Levico, useful, and in summer prescribe these to be drunk slowly outside before breakfast, and in the afternoon, in all cases where the conditions render this possible. Turkish baths are also useful. After fevers, iron and quinine, and a generous diet, with regular intervals of rest, are indicated.

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THE USE OF QUININE AS A SUBSTITUTE FOR ERGOT IN MIDWIFERY.

By G. Owen C. Mackness, M.D., Broughty Ferry.

One may, I think, assert without fear of contradiction, that in this country, at any rate, the use of no drug is so universal as that of ergot in midwifery. The student who is launching on the unknown sea of his "cases" feels that his first step is taken when he has purchased it—the general medical practitioner, summoned in haste, may forget his chloroform and his forceps, but will not omit to put ergot in his pocket—the midwife gives it in all and sundry cases where delay occurs in the delivery, too often, alas! with most disastrous effects to both mother and child. Our patients, more especially those who have already been through the hands of the older school of practitioners, clamour, one and all, for the "doctor's tea" as soon as the pains begin to flag, and although the younger generation may rather beg for chloroform, it is not probably because they disbelieve in the efficacy of ergot, but rather because they desire their labour to be painless.

The tendency of modern teaching is to condemn its use, and yet in spite of this, and the fact, while the text-books warn us of its dangers and point out its defects, that all of us have probably by practical experience proved how true this condemnation is, it is still almost universally employed. The reason is not far to seek, for in many cases the labour pains are found to fail, and there is hesitancy on the part of the medical attendant to apply forceps and complete the labour, either because the patient or her friends object to instrumental interference, or because he himself feels that with some slight stimulus Nature herself ought to complete the delivery. He at once administers ergot, not perhaps being ignorant of its defects, but because to the majority of men it is the only drug having this ecbolic action with which they are acquainted. Recently, of course, quinine has been largely used in its place, but the knowledge of this action of the drug is far from universal, and it is only used by a very small minority of practitioners. For this reason I have ventured to bring before the Society a few notes from my own practical experience of this drug, hoping that those who have had a larger experience will give us the benefit thereof.

The disadvantages of ergot are so well known that they may be dismissed in a few words.

1. Its preparations are very unreliable in potency and action; why this should be the case, I am unable to say, but all must have noticed how variable are different specimens of the same preparation, and how often one gets a specimen which is practically inert.

2. It is difficult to administer; the liquid preparations, when given by the mouth, are nauseous in taste, and when given in large doses very frequently produce vomiting. Ergotin is a difficult preparation to keep; when made into pills they rapidly deteriorate, while a solution for hypodermic use, even when made up with antiseptics, soon goes wrong; further, although it rarely causes abscess when deeply injected into the muscles, still it produces a considerable amount of pain. Of ergotinin I am unable to speak, as I have no experience of its use.

3. What we aim at in its administration is an increase of the labour pains with relaxation between them, just as occurs in normal labour; this is not the action of ergot. Lauder Brunton well describes its action when he says that it "causes tetanic contraction of the uterine muscles, with occasional increases of violence. There is no complete relaxation between the spasms as in ordinary labour pains." This tetanic contraction has been recognised by all the text-books, and must have been noted practically by all of us who have watched its action. It has been stated that unless delivery is effected within half an hour of its administration, that is, before the tetanic contraction is fully developed, other means must be resorted to. This tetanic contraction is dangerous, not merely to the mother, but in a high degree to the child also, in that it interferes with the placental circulation to such an extent that asphyxiation is very apt to occur.

4. It is said to cause "hour-glass contraction" of the uterus, but this result is so rare that it may almost be neglected.

The advantages of quinine, on the other hand, may be stated as follows: It can easily be administered in the form of a pill, which will keep for any length of time without deterioriation; in this form it is tasteless, and has no tendency, even in large doses, to produce vomiting.

Its action, further, is more certain than that of ergot, in that there is no variability in its composition, while the pills, if properly prepared, are easily soluble in the acid gastric juice, so that it acts rapidly; as a rule, one begins to see its effects within, at the outside, twenty minutes after administration.

The chief advantage of quinine is, that it does not produce tetanic contraction of the uterine walls, but merely increases the strength of the labour pains, while relaxation occurs in the intervals just as in a normal labour. This fact has been verified over and over again, by placing the hand on the abdominal walls after the drug has been administered.

It is especially of use in those cases where the delay in delivery is due to inertia uteri pure and simple, *i.e.* where the inertia is caused by the general exhaustion of the patient, or by actual want of power in the uterine muscles themselves, and where there is no obstruction present in the passages, such as rigid cervix, contracted pelvis, or rigid perineum, to hinder the delivery of the fœtus, and where the delay is not caused by some deviation from the normal in the fœtus itself—here, of course, ergot is contra-indicated, and so is quinine.

In primiparæ, however, where all is normal, but where slow dilatation of the passages causes exhaustion of the uterine muscles before they can effect their object, I have found that quinine will often give fresh tone and stimulate them anew, so that they are able to effect delivery without instrumental interference.

Its action, of course, is not always certain, and there still remain a large number of cases where forceps are required; but since commencing its use, my own experience has been that one requires to resort to forceps much less often, and cases which have before always required their use have been completed by natural effort alone.

As to its dose and form of administration, I am in the habit of using 4-gr. pills of the sulphate. Of these, two are given, and if the pains do not increase sufficiently, another is given in an hour, and yet another an hour later. As a rule, however, the second dose is effectual, and one rarely has to give the third, making 16 grs. in all. One would naturally expect that with this large dose toxic symptoms would follow, but for some unexplained reason, although I have now used the drug in a very large number of cases, and always in these large doses, which in an ordinary case would undoubtedly produce symptoms of quinism, yet I have never once met with them—no headache, deafness, nor noises in the ears, ever have resulted.

Three typical cases of its use may be shortly related.

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By G. Owen C. Mackness, M.D., Broughty Ferry.

One may, I think, assert without fear of contradiction, that in this country, at any rate, the use of no drug is so universal as that of ergot in midwifery. The student who is launching on the unknown sea of his "cases" feels that his first step is taken when he has purchased it—the general medical practitioner, summoned in haste, may forget his chloroform and his forceps, but will not omit to put ergot in his pocket—the midwife gives it in all and sundry cases where delay occurs in the delivery, too often, alas! with most disastrous effects to both mother and child. Our patients, more especially those who have already been through the hands of the older school of practitioners, clamour, one and all, for the "doctor's tea" as soon as the pains begin to flag, and although the younger generation may rather beg for chloroform, it is not probably because they disbelieve in the efficacy of ergot, but rather because they desire their labour to be painless.

The tendency of modern teaching is to condemn its use, and yet in spite of this, and the fact, while the text-books warn us of its dangers and point out its defects, that all of us have probably by practical experience proved how true this condemnation is, it is still almost universally employed. The reason is not far to seek, for in many cases the labour pains are found to fail, and there is illustrated. The difficult subject of bronchiectasis might perhaps have been made a little clearer. The short account of vagus pneumonia is excellent, and a very good account has been given of actinomycosis of the lung. The term phthisis pulmonalis has hardly been sufficiently explained, though the various tubercular diseases of the lung have been clearly and fully described. The parathyroid glands should have received more attention. The next section deals with the urinary system. It is admirably clear, and excellently arranged and expressed. In addition to giving his own views on Bright's disease, which have received wide acceptance, he has given short accounts of the different and contradictory views held by other authorities, which the reader will find convenient for reference. The scanty reference to glomerular nephritis is a distinct desideratum, however, and perinephric abscesses should hardly, nowadays, be spoken of as perinephritic. The illustration of gonorrhœal urethritis is good, but further particulars of the relations of the gonococcus to the parts of the mucous membrane might have been given with advantage. The next section (the fifth of the book) is devoted to the genital system. It is a large one, and deals with the testis and its appendages, the seminal tract, and the penis; the ovaries, the uterus and Fallopian tubes, the vagina, the pelvic peritoneum and connective tissues, the pudenda, the pregnant uterus, and the ovum, and lastly the mammary glands. This section is a valuable one, and we are glad to see such justice done to it, as it is often treated rather scurvily in lectures and books of pathology. The account of the diseases of the testis has the advantage over that of the ovaries; and the diseases of the mammary glands, particularly the cancerous ones, might well have received more generous treatment. Section sixth is devoted to the eye, and will be found by the student to give him an admirable introduction to the study of its diseases. These are clearly and succinctly described; embolism of the central artery of the retina, trachoma, spring catarrh of the conjunctiva, neuro-paralytic keratitis, optic neuritis, and glaucoma perhaps call for special mention. The last section, the seventh, gives a short and useful description of the diseases of the ear; the external ear, the tympanic membrane, the middle ear, and the internal ear, being all duly treated of in turn. The whole book is profusely illustrated by some 250 figures, many of which are quite new. Many of the illustrations are most admirable. Many of the pictures are appropriately coloured, and thus add another to the many attractions of the book. Each chapter has appended to it an excellent and usefully complete list of references. There is no doubt that the book will not only uphold but enhance the high reputation of its author, and it can be most cordially recommended to all interested in pathology, whether students or practitioners.

R. F. C. LEITH.

Chirurgische Operationslehre. By THEODOR KOCHER, Professor of Surgery in the University of Bern. 3rd Edition. Jena: Gustav Fischer. 1897.

IN spite of the fact that there has appeared an excellent translation of the last edition of Kocher's work on Operative Surgery, by Mr. Harold J. Stiles, it is not so widely known, nor are its merits so generally recognised, as it would appear to deserve. It has always been our mpression that to have read his book and to have employed the numerous procedures which he has introduced, constitute an experience which no practical surgeon can afford to dispense with. We have heard the book adversely criticised, because many operations are omitted *e.g.* amputation of the penis, that for cleft palate, etc.), and because many of the procedures therein described are dealt with exclusively from the author's point of view, that it savoured too much of "a gospel according to Kocher." While there may be some truth in these criticisms, it is safe to maintain that the value of any book, from the reader's point of view, depends more upon the amount and accuracy of the original work which it may contain than upon any additions which are made to the latter from other and easily accessible sources. In the preface, the author himself refers to the work as his "little handbook," and deprecates the idea that it is intended to compete with any of the larger treatises on the subject.

The third edition, with which we are at present concerned, has been extended and improved in many ways; it is larger than the second by nearly 100 pages; the illustrations, which have always formed a striking feature, have been considerably increased in number. The heading of the different paragraphs has been altered so as to strike the eye more readily, and an index has been provided at the end of the volume. In contrast to previous editions, the present one exhibits, on the part of the author, a very much more extended knowledge of the published work of other surgeons and a more adequate recognition of the procedures which they have originated. On looking into the book more carefully, we find, in the first place, that the chapter on *anæsthetics* has been considerably added to; it will be read with interest as an unbiassed statement regarding the relative claims of ether and chloroform. The chapter on *wound treatment* has also been extended, and may be described as a most reasonable account of the aseptic as contrasted with the antiseptic system. In the regional description of individual operations, the section which relates to *the head and neck* has been but little altered. For exploratory operations upon the brain, when a small opening will suffice, Doyen's perforators are recommended in preference to the ordinary trephine. A new paragraph has been added on excision of the temporo-maxillary joint, and on the reduction of old dislocations of the jaw by the open method. The author is justified in describing the operations for the removal of an innocent goitre as free from danger nowadays, for he has not had a single mishap in his last series of 175 cases; several instructive illustrations have been added to the article on goitre, of which one may be specially mentioned as showing the relations of the recurrent laryngeal nerve to the inferior thyroid artery.

In the section dealing with *the thorax* there is described a much more radical operation for cancer of the breast, somewhat on the same lines as that practised by Halsted of Baltimore. Kocher claims to have gained a marked improvement as regards immunity from recurrence since he has practised this operation, while, as regards the functional results, it is noteworthy that the disability resulting from the removal of the pectoral muscles is of little moment; on the other hand, the interference with the outflow of lymph from the arm may be so considerable (especially if the axillary vein have been ligatured at the sa-time) that there may be a permanent solid œdema of the arm (as elephantiasis), which very much interferes with its usefulness.

An operation is described for opening and draining the pericardiu. In the treatment of cases of empyema of long standing the author r-gards Delorme's method of decorticating the collapsed lung as of considerable value.

In the surgery of *the abdomen* we find that the author continues t practise the same operations on the kidney as are described in the pre-ceding editions. In excising the organ, on account of infective condition-he prefers catgut to silk for ligature of the vessels, while the ureter i either excised, or is secured in the wound in the loin, so that in tubercular conditions it may be employed as a channel for the intr-duction of iodoform emulsion; this method is stated to have yielde very excellent results, especially where there is cystitis.

The article on gastrostomy has been rewritten; the method of Albert or Frank is very properly restricted in its application, for it is not alway possible to pull out of the abdomen a satisfactory diverticulum, owing to the shrunken condition of the stomach in patients suffering fro œsophageal cancer. The method recommended and illustrated in th present edition is a combination of the procedures of Frank, v. Hacker and Witzel, whereby there is formed a long narrow canal through th substance of the rectus muscle, which prevents any leakage whatsoever the feeding-catheter is only introduced at meal-times, whereas in Kaders' modification of Witzel's method, as practised by Mikulicz there is the decided disadvantage that the tube must be permanently retained.

In innocent stricture of the pylorus, Kocher agrees with Doyen in regarding gastro-jejunostomy as more certain of affording relief, and a being attended by less immediate danger, than pyloroplasty, whic would appear to be the operation of choice in this country. In the making of communications between the various hollow viscera of the abdomen, the author holds that well-applied sutures are to be preferr to any mechanical contrivance; but whenever suturing is difficult o impossible, he has recourse to the Murphy button; its chief drawback in Kocher's opinion is that one is at the mercy of the manufacturer, wh may have failed to properly construct it.

Inasmuch as any of the palliative operations for cancer of the pylorus can, at the most, prolong life for one year, Kocher recommends excisio in selected cases, and reports a case of his own, operated upon nine years ago, which may be regarded as a radical cure, for the patient is in perfect health, and has excellent powers of digestion. Since the second edition was published, he has operated in a further series of fifteen cases, with thirteen recoveries, including one in which he had to resect 20 cms. of the transverse colon in addition to the pylorus.

In the section which deals with operations on the gall bladder and bile ducts, the different procedures are described for giving relief in cases in which a stone has become impacted in the common bile duct: the author would appear to restrict choledocho-lithotomy to those in which it is possible to close the wound in the duct by an accurately applied suture; otherwise, he recommends that one establish an external biliary fistula, or a communication between the gall bladder and intestine, preferably the latter; while in the difficult cases in which it is impossible to do so, because the gall bladder is contracted and inaccessible, to establish a communication between the common duct and the duodenum.

In his well-known operation for the radical cure of hernia, while he still practises the lateral displacement of the neck of the sac, the latter is no longer twisted, because this may lead to its necrosis.

It is interesting to find that the author remarks, in relation to the operation for cancer of the rectum, that one may meet with an occasional death from septic infection (originating from the bowel), in spite of every possible precaution, and that the only certain method of preventing such infection is to make an artificial anus in the sigmoid flexure several days before the extirpation of the growth. The fæces being diverted, it is then possible to thoroughly disinfect the lumen of the bowel, and in doing so one may with advantage destroy with the cautery the ulcerated surface of the cancer.

The section dealing with the *arteries and nerves of the extremities* is practically the same as in the preceding editions.

The section on *excisions and resections of bones and joints*, always remarkable for its originality and thoroughness, has been largely re-written. Most readers will bear out the author's introductory statement, that the time of typical excisions has passed away, and that the guiding principle, especially in tuberculosis, is to secure the freest possible exposure of the joint structures with the minimum of damage, and to remove only the parts which are diseased. The operations on the ankle and knee have been considerably modified, and new illustrations have been introduced in connection with the hip, elbow, and shoulder.

In the concluding section on *amputations and disarticulations*, great stress is laid, at the outset, on the importance of securing for the sawn end of the bone a covering of bone or of periosteum, or of both; in other words, a wider application of the principle which underlies the procedures associated with the names of Gritti and of Pirogoff. Edinburgh surgeons will be interested to find that the method of amputation at the ankle by internal plantar-flap, which we have been accustomed to describe as that of Mackenzie, is regarded as the best, and as much to be preferred to the original operation of Syme, against which Kocher repeats his old grievance that the heel-flap results in a cavity "which is filled with nothing." The oval or racket method of disarticulation at the shoulder is now for the first time associated with the name of Spence, who first described and practised it. An operation for the removal of the lower extremity, along with the corresponding half of the pelvis, is described at considerable length, and an instructive figure is introduced, illustrating the interscapulo-thoracic amputation by the method of Berger.

Enough has been said, within the limits of the present article, to indicate that this new edition of Kocher's work on Operative Surgery is a worthy successor of those which have preceded it, and as such should be in the hands of every practising surgeon.

ALEXIS THOMSON.

Manual of Operative Surgery. By H. J. Waring, F.R.C.S., Demonstrator of Operative Surgery at St. Bartholomew's Hospital. Edinburgh and London: Young J. Pentland. 1898.

This goodly-sized volume is the result of a praiseworthy effort to furnish the student with a text-book of operative surgery which would be within his compass and yet fulfil all requirements. In many respects it is an excellent book for students, being very systematic, clearly written, and not too ambitious; if anything, it errs in being too long, and might be condensed with advantage, not so much in its scope as in the manner in which the different operative procedures are described. The constant repetition of the different stages of operations, of the position of the patient, and of the operator and his assistants, of the list of instruments required, is tedious and often unnecessary; it seems hardly fair to expect the student to burden his memory as to which side of the patient is the proper one for the surgeon; in most operations this may be safely left to spontaneous initiative, and, in the remainder, it is largely a question of individual preference. Lists of instruments in which the same routine, scissors, needles, artery and other forceps figure again and again, are less convincing than the special mention of the one or two which are essential. The illustrations are numerous, and, on the whole, distincly instructive; some of those, however, which illustrate incisions are either unnecessary or misleading. Fig. 103 does not represent an obturator hernia. Fig. 165 exhibits a patient with empyema "placed lying somewhat on the sound side" with a view to operation, an attitude which may be convenient on the cadaver, but which must be avoided in the living. Fig. 336 represents the method of dissecting back the cuff of skin and fasciæ in a circular amputation through the upper arm, with the edge of the knife scoring the flap in a fashion which Mr. Waring himself would be the first to condemn. It is only in compliance with the author's request, as stated in the preface, that those who may use the book should make suggestions or corrections, that we take it upon ourselves to point out a few minor inaccuracies.

Cholecystotomy (p. 132) is obviously a misprint for cholecystostomy; the lines of incision in enterectomy do not harmonise with the known facts as to the distribution of the intestinal blood vessels; that it is difficult to prevent regurgitation after a Witzel's gastrostomy is not the usual experience; the giving of opium by the mouth every few hours after enterectomy is open to criticism; the scalpel is inferior to the cautery as the instrument to be selected for opening the bowel in establishing an artificial anus; in operating for liver abscess and for hydatids, we should have thought the transpleural route worthy of being mentioned; in the surgery of the urinary bladder, it is scarcely orthodox to suture the mucous membrane, as is recommended on several occasions.

Apart, however, from these and similar little points in detail, we have read this book with interest and satisfaction, and we regard it as quite the best book on operative surgery, from the students' standpoint, with which we are acquainted.

Alexis Thomson.

Cutaneous Medicine: A Systematic Treatise on the Diseases of the Skin. By Louis A. Duhring, M.D., Professor of Diseases of the Skin in the University of Pennsylvania. Part II. Illustrated. London: J. B. Lippincott Co. 1898.

Copiousness of illustration strikes one as the most prominent feature of this volume. Nearly every phase of the diseases of which it treats —ranging from erythema to zoster—finds it appropriate pictorial reproduction. Many of these plates are of great excellence, and convey, as fully as anything in black and white can, a correct idea of the lesions. To the skilled observer, to one to whom the complaint is familiar, there is no difficulty in appreciating their accuracy. But to the ordinary practitioner, whose eye is less trained by habitual practice in judging of nice points of distinction, the absence of colour is a serious want. Besides those devoted to the clinical aspects, there are a number of figures exhibiting the histological appearances. The description of the ailments themselves is given in great detail, particular prominence being assigned to history, to symptoms, and to diagnosis. Looked at from a critic's point of view, the elaboration, at times, goes too far, and there are unnecessary repetitions of statement, but with all this the accomplished author constantly gives proof of his wide experience, by directing attention to minutiæ which would have been overlooked by one less versed.

After a short account of classification in general, Duhring indicates his preference for that, based on Hebra's, which he employed in his previous treatise, with certain modifications. The two first classes, including anæmias and congestions, with about one-third of inflammations, are discussed in this part. Of the 271 pages which it contains, 111 are devoted to eczema. From this it will be seen that this important subject is dealt with at much length. Duhring does not seem disposed to accept the catarrhal theory of eczema, nor does he admit its purely mycotic nature. The seborrhœic eczema of Unna is regarded as in some cases a combination of seborrhœa and eczema, in others as a disease *sui generis*, and in a third class as a mixture of several distinct conditions. He thinks there is a seborrhœic psoriasis as well as a seborrhœic eczema, the seborrhœic being but a complicating element. The treatment is fully and carefully laid down, and embraces the older and more tried as well as the newer remedies. Impetigo as a special form of disease is recognised, and he retains ecthyma, a useful term for a well-marked group of symptoms, though one which some urge ought to be abolished. He places impetigo herpetiformis alongside dermatitis herpetiformis; but neither in the volume nor in the classification do we find any mention of hydroa vacciniforme or æstivale. It may take a place, however, under dermatitis calorica, perhaps in a uture part. Herpes zoster terminates the present instalment. Immense are and trouble have been exercised in searching the literature of dermatology, and if the style may at times appear rather diffuse, the work promises to be of great value from its thoroughly exhaustive haracter.

W. Allan Jamieson.

A Manual of Obstetric Practice for Students and Practitioners. By Professor DÜHRSSEN. Translated from the Sixth German Edition by J. W. TAYLOR, F.R.C.S., and F. EDGE, M.D. London: H. K. Lewis. 1897.

WE may say at once that this work is a useful compendium of modern German midwifery, and will repay study by any one wishing to become acquainted with what is being done on the Continent. Whether it can ever hope to displace British text-books as a manual for students is another question. The directions for the management of labour in pelvic presentations are good, due emphasis being laid on suprapubic pressure by the attendant while the accoucheur is delivering. Antiseptic precautions are well described throughout, and we are glad to see the author urge the wearing of a washable overall as a routine practice by the accoucheur at confinements; we ourselves adopted this custom some time ago. The author advises the careful disinfection of the outer genitals in all cases; and, what appears to us more doubtful, the douching of the vagina before examination, as a routine practice, though he admits that in private practice the vaginal douche may not be practicable without anæsthesia. Among methods of treatment we may note that Dührssen permits vaginal plugging in accidental hæmorrhage, if the patient be at the same time carefully watched, so that the plug may be at once removed should hæmorrhage continue internally. He considers plugging absolutely contra-indicated after the rupture of the membranes. Symphyseotomy he considers to be still *sub judice*. He warns against the risks and high death-rate of the Cæsarean section, and for certain cases recommends what he calls vaginal Cæsarean section—delivering per vaginam, after incising the lower uterine segment.

In many points of detail we do not consider the work a suitable one for British students. New terminology is introduced, but does not seem to simplify the subject. "If the back is to the left we call it the first position; if to the right, the second position." Flexion and extension of the head are spoken of as the "first and third rotations" respectively. Naegele's obliquity is called the fourth rotation. The passage of the head from the uterus into the vagina is called "crowning." Walcher's position is referred to, but not described in such a way as to be of service to a student; it is not mentioned in the index. The description of vaginal Cæsarean section is not very clear, but this is of less consequence, as the author gives warning that it is not attempted by anyone unskilled in vaginal cœliotomy. In a translation, intended presumably for people unfamiliar with German, references to methods merely by men's names, without description, must be often unintelligible. Surely the word "fatal," at top of page 289, does not convey the author's meaning, in describing the hæmorrhage which occurs after emptying the uterus in Cæsarean section. The author denies that the elastic ligature is a cause of this hæmorrhage, but where the ligature is not used, serious hæmorrhage is rare; and hæmorrhage during the incision of the uterus may be avoided by the use of a ring pressed against the front of the uterus (Cameron's method).

E. H. L. OLIPHANT.

RECENT ADVANCES IN MEDICAL SCIENCE.

MEDICINE.

UNDER THE CHARGE OF

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CHRONIC INFECTIOUS JAUNDICE, WITH SPLENIC ENLARGEMENT.

PROFESSOR HAYEM (*Presse méd. belge*, Bruxelles, 9th March 1898) contributes an article upon "a particular variety of chronic jaundice," which he describes more definitely as "chronic infectious paroxysmal jaundice with splenomegaly." To summarise his remarks: he first notes that our knowledge of chronic jaundice is still very imperfect; we recognise forms of the disease caused by obliteration of the bile duct; by its obstruction from calculi, tumours, etc.; and by hypertrophic biliary cirrhosis. Beyond these varieties our knowledge is scanty.

Hayem indicates another form of chronic jaundice common to many dyspeptics, accompanied by buff colour of the skin, especially of the skin of the palms, by the blood yielding Gmelin's reaction, and by the absence of any bile pigment in the urine. He has seen many such cases, in which the urine was free from bile pigment, although the skin was intensely jaundiced. Another variety, also connected perhaps with the digestive processes, but constituting a clinical type apart from other forms of jaundice, is characterised by recurring paroxysmal attacks, by enlargement of the spleen, and a less marked increase in the size of the liver, by symptoms of dyspepsia, and by a high degree of anæmia.

Of the five illustrative cases of the last type referred to, the first, a man æt. 38, had suffered from many diseases, among them—enteritis, twice; intermittent fever, thrice, accompanied by diarrhœa; and typhoid fever. In 1874, after the attack of typhoid fever, he became jaundiced, unattended by painful crises. Since that time, *i.e.* for nineteen years, the jaundice has never disappeared. In 1886, Hayem found him suffering from a subacute jaundice, and from copious diarrhœic stools, which were often bile-tained; the only pigment in the urine was urobilin, but Gmelin's eaction was obtained from the blood serum, which was coloured yellow; he liver was enlarged, the spleen larger in proportion, and there was ntense anæmia. This condition persisted up to 1894, with several more or less acute attacks of acute icteric symptoms. In 1894 constipation took the place of diarrhœa, while, when the more acute paroxysms occurred, the liver became congested and the spleen markedly enlarged. After each crisis the liver returned to its normal size; the spleen, however, became, little by little, larger and more indurated. There never was any fever nor hepatic colic.

At the present time the liver extends to a little below the margin of the ribs, but it is neither tender to touch nor indurated. The spleen measures 20 by 12 cms., is often visible on inspection, and on palpation feels indurated. The urine contained much urobilin, no albumin or bile pigments, but the blood serum contains the latter in marked amount. The only other point of interest is that the patient presented all the characters of "infantilisme."

The second case, a laundress, æt. 24, was also "infantile," and had a poorly-developed uterus. She had suffered for an indefinite period from jaundice with painful crises, but the stools were never clay-coloured, the liver never appreciably enlarged, though the spleen was slightly increased in size and tender, and intense chlorosis was present. During the large number of crises observed, in only two did the urine contain bile pigments, in only one were the fæces pale. As the case progressed, the spleen became larger and more tender on pressure, and the liver also showed signs of enlargement. No rises of temperature were observed. The gastric contents, when analysed, indicated, as was the case in the preceding patient, the presence of a hyperpepsia.

The third patient, a man, æt. 35, was pronounced by the military medical officer, at the expiry of his term of service, to be suffering from splenic leukæmia. When seen by Hayem, he looked robust, strong, but anæmic and slightly jaundiced. He suffered no discomfort from his ailment, had no digestive troubles. The liver, however, was enlarged, but not tender; the spleen resistant to pressure, tender, reaching almost to the umbilicus. The urine yielded the reactions indicative of urobilin, not of bile pigments, which, on the contrary, could be easily detected in the blood. Examination of the blood showed an anæmia of the "second degree," and a slight leucocytosis.

The other two patients presented similar symptoms, but not in so definite a manner.

In all these cases jaundice was present, the colour of the skin increasing during the exacerbations, but not disappearing altogether between them; during these exacerbations the urine might sometimes respond to Gmelin's test, but never gave the reaction in the intervals, although the blood serum always yielded a positive result. The fæces were almost never decolorised. If the liver was enlarged, it was never indurated or acutely tender; the spleen presented exactly the opposite signs. Space does not permit of further details, save to add that diplococci, similar to the pneumococci of Talamon-Fränkel, were grown from the liquid removed from the spleen in one of the cases. Hayem regards this condition as one of intestinal infection, not of extreme danger to life, but as a disease not very amenable to treatment. Treatment can only be symptomatic, especially directed towards the intestinal canal.

Boix (*Compt. rend. Soc. de biol.*, Paris, 10th October **1897**, quoted in *Settimana med. dello Sperimentale*, 1898, p. 149), in a note

Hanot's disease, or hypertrophic biliary cirrhosis with chronic icterus, concludes that the enlarged spleen remains of the same size during the evident course of the liver disease, though it may have enlarged before the hepatic symptoms commenced. The enlargement of the spleen is pathognomonic of Hanot's disease, and if, as is said, it is not of malarial origin, it certainly appears to be due to some form of infection from water. The disease is a specific disease, arising from a special infection of the tissues of the liver and spleen, not a hepatic affection alone, as lately asserted by Gilbert and Fournier.

HYPERTROPHIC HEPATIC CIRRHOSIS.

In the *Gaz. d. hôp.*, Paris, for 26th February of this year, Léopold Lévi discusses the clinical diagnosis of hypertrophic hepatic cirrhosis. He states that there is not one only form of this disease, but many—Hanot's disease, hypertrophic cirrhosis with chronic icterus; fatty hypertrophic cirrhosis (Hutinel, Sabourin); pigmentary hypertrophic cirrhosis (Hanot, Chauffard); alcoholic hypertrophic cirrhosis (Hanot, Gilbert); hypertrophic cirrhosis from auto-intoxication (Hanot, Boix, *vide* above; syphilitic hypertrophy, with chronic icterus (Hanot). It is worth noting, *en passant*, that only French authorities can have sufficient knowledge of hepatic cirrhosis to classify its different forms; the observers and clinicians of other countries are not worthy of notice.

The diagnostic points insisted on in cases of hypertrophic cirrhosis with icterus are—(1) Enlargement of the liver; (2) hepatoptosis or downward displacement of the liver; (3) icterus; (4) discoloration of the fæces. In similar cases, but in which the fæces retain their normal colour, Hanot's disease is characterised by persistent jaundice, enlarged liver (gradually increasing and slightly tender on pressure), great enlargement of the spleen, no clay-colour of the stools, and no ascites. It is an auto-infection of the liver and spleen from the intestine. It generally occurs in badly-developed individuals between the ages of 20 and 30. Hanot has described bulimia as one of the earliest symptoms, while Surmont has shown that the urine is less toxic; Tissier, that urobilin is absent from the urine, that alimentary glycosuria may be present, and the leucocytes are increased in number. Two patients with these symptoms were seen by Lévi in Hanot's wards, one of whom presented signs of arrested development. In both, the spleen extended down into the left hypochondrium, measuring 31 by 13, and 33 by 24 cms. respectively.

Chronic jaundice of syphilitic origin resembles the preceding form, but is not characterised by hyper-leucocytosis bulimia, and is rapidly diminished in intensity by specific remedies. Fatty hypertrophic cirrhosis of the liver may be tubercular or alcoholic. The temperature rises and falls throughout, the course is rapid, the liver and spleen greatly increased in size, and death may ensue in six to eight weeks. Hypertrophic cirrhosis with discoloration of the fæces occurs under various conditions—as, cancer of the head of the pancreas, biliary lithiasis with enlarged liver, and hydatid cysts in the liver. The details of these different forms must be obtained from the original paper.

The diagnosis of hypertrophic cirrhosis of the liver, unaccompanied by jaundice from primary or secondary causes, or of abscess of the liver, rests upon well-known grounds. But if these are excluded, the forms of liver enlargement due to backward pressure from disease of the lungs, or of the heart or ducts, constitutional affections still remain diverse in character, and are rendered still more so by the frequent presence of more than one cause. Lévi proceeds to describe the diagnostic signs of the cirrhotic syndrome, of the hereditary syphilitic liver, tubercular hypertrophic cirrhosis, lardaceous liver, malarial liver, and the hypertrophic pigmentary cirrhosis of the liver due to malarial infection or to diabetes.

SURGERY.

UNDER THE CHARGE OF

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RESULTS OF OPERATIONS UPON THE SEXUAL ORGANS IN CASES OF ENLARGED PROSTATE.

IN continuation of our abstract in the last number of the Journal of the paper by MM. Albarran and Motz on this subject (*Ann. d. mal. d. org. génito-urin.*, Paris, January, February, and March 1898), these authors next describe—

The effects of castration upon the bladder in cases of enlarged prostate.—The important influence exercised by the condition of the bladder in the clinical features of enlarged prostate is well known. In early cases with simple dysuria, with or without cystitis, double castration is rapidly followed by cure or amelioration of the symptoms, in virtue of the diminution of congestion in the parts concerned. Similarly, in cases of acute and recent retention, the results are truly remarkable, and are to be ascribed to the same mechanism. The authors have been unable to find a single recorded case in which there has been a recurrence of the retention, whereas, in prostatic cases apart from castration, such a recurrence is the rule. In the chronic cases with incomplete retention, or, as they are usually described in this country, cases with residual urine, the capacity for emptying the bladder has greatly improved after castration, and the frequency of micturition has been diminished. Finally, in cases of chronic complete retention (atony with overflow), the power of spontaneous micturition was restored in the majority of cases submitted to castration, and this was the case even where it had been lost for periods of years. By means of a manometer, it has been demonstrated that the contractile power of the bladder is increased as a result of castration; this cannot be wholly ascribed to diminution in the size of the prostate, for it has been observed in cases in which no such diminution occurred.

Objections to double castration.—While the operation itself may be regarded as one of little gravity, it has been attended with a mortality of something like 14½ per cent. This is doubtless due to the fact that many of the cases which have been subjected to the operation are the victims of grave renal and general infection; this is borne out by the fact that the mortality, in 220 cases of enlarged prostate admitted to the Neckar Hospital, who had no operation whatever, amounted to 14 per cent. In those cases which have died with delirium after castration, it is impossible to distinguish between that which is due to the operation and that which is due to urinary or other infection. Psychical symptoms following castration are exceptional, and, as a rule, evanescent; they are regarded by the authors as of very minor importance. The operation is, however, contra-indicated where there are evidences of grave renal or general infection, and in cases where the "accidents" of prostatic enlargement (dysuria, acute retention) can be cured by simpler means. In chronic retention, on the other hand, whether complete or incomplete, castration is indicated whenever the so-called "catheter life" is impracticable, irrespective of the nature of the prostatic enlargement, and in spite of the loss of the contractile power of the bladder; the only contra-indication in this group is to be found in cases in which there is a well-marked intravesical projection of the prostate, amenable to suprapubic prostatectomy.

It is interesting to find that the authors hold that the consistence of the prostate is no guide to its histological structure, nor to its amenability to castration.

Unilateral castration is not recommended in cases of enlarged prostate.

Resections of the vasa deferentia (vasectomy) is regarded as uncertain in its results; these occur later, and are less in degree than those following castration, while resection of one vas fulfils no indication whatever.

Resection of the spermatic cord as a whole has been followed both experimentally and clinically by sloughing of the testicle, and should not be had recourse to.

Angio-neurectomy of the cord (an operation introduced by the authors in 1897) consists in resecting a portion of the vessels and nerves, excepting the vas itself, the deferential artery, and one or two veins accompanying the latter; it results in an atrophy of the testicle without sloughing, and a diminution in the size of the prostate, similar to that observed after double castration. It may therefore be preferred to castration in cases where the patient is anxious to retain his testicles, or where the former operation appears to be attended with greater danger to the patient.

Various other procedures have been carried out experimentally, but have nothing to recommend them; these include ligature of the spermatic arteries; resection of the nerves of the cord; excision of the body of the testicle and leaving the epididymis; interstitial injections into the testis of chloride of zinc, or of iodine, etc. etc.

The choice of operation in enlarged prostate.—In the early years of irritability of the bladder and of satisfactory catheter life, and in acute recent retention, there is no indication for operation. When, however, there is a history of chronic incomplete retention, and our services are requested during an attack in which the retention has become complete, while we might relieve this with the catheter, we should know that such a crisis will recur with repeated risks of renal injection; the authors therefore recommend double castration, as giving the best and most certain results in the direction of radical cure. Excision of the middle lobe, or cauterisation of this lobe by the method of Bottini, are only applicable in cases in which the existence of this lesion has been demonstrated with the cystoscope. Cystotomy and drainage is to be reserved as a palliative measure in cases in which evidence of grave septic infection already exists.

Inherited Syphilis.

Jonathan Hutchinson, in an article on inherited syphilis, lays stress upon the following points, based upon his own most extensive experience:—That the subjects of taint often grow up into healthy men and women. That complete exemption from other indications of taint does not exempt from the risk of an attack of keratitis. That it is not unusual for one child in a family to suffer very definitely, whilst all the others apparently escape. That it is very exceptional for any considerable series of children to suffer in succession from inherited taint. That the mother of one or more syphilitic children may herself remain throughout quite free from symptoms, and apparently in good health. That a condition of general arrest of growth may be one of the consequences of inherited taint. That it is possible for children born within dangerously short periods of the primary disease, in one or both parents, to entirely escape the inheritance. That although, as a rule, after keratitis, choroiditis, etc., the recovery is permanent, there are exceptional cases in which certain progressive changes continue. That it is by no means improbable that some who really inherit taint never, either in infancy or subsequently, show any symptoms. That the children of those who have suffered from inherited syphilis are usually quite healthy. That syphilitic infants may be suckled by their mothers, as a rule, without risk to the latter (Mr. Hutchinson's whole experience affords no trustworthy exception to either of these last two propositions).—*Arch. Surg.*, London, January 1898.

The Surgical Treatment of Pericarditis.

Brentano is of opinion that surgical interference is indicated in pericarditis—first, in cases where the exudation is purulent; and, secondly, in serous, serofibrinous, and hæmorrhagic effusions, where life is endangered by the mere amount of fluid within the pericardial sac. After proper reference to the difficulty of accurate diagnosis, the different methods of evacuating the fluid are discussed as follows:—

1. *Simple puncture*, with the aspirator or trocar and cannula, commends itself as an easy operation. At the same time, it may be difficult to determine the best point at which the puncture is to be made, and there is also the risk of wounding neighbouring structures, especially the heart and pleura. The heart may be wounded as the result of a mistaken diagnosis and of the absence of fluid in the pericardial sac, or as the result of its position within the distended pericardium, for it may still lie in contact with the anterior wall of the

latter in spite of the accumulation of fluid. The reflection of the pleura at the level of the fifth and sixth ribs is found behind the sternum in more than two-thirds of the cases investigated by the author, and is therefore liable to be wounded. It is a mistake to believe that the pleural reflection is displaced outwards, in proportion to the distensions of the pericardial sac. Lastly, it is very difficult to completely empty the pericardium by simple puncture.

2. *Incision of the pericardium*, through one intercostal space, is attended with the risk of wounding the pleura and of wounding the internal mammary vessels, while the access is insufficient, and one cannot see what one is doing.

The author therefore recommends *a preliminary resection of rib* in all cases. His procedure is to resect the fifth left costal cartilage along with its perichondrium, to ligature the internal mammary vessels, and to separate the fibres of the triangularis sterni muscle. The reflection of the pleura is then identified, and displaced outwards, and the pericardium is incised. All clots or masses of fibrin are removed. The sac should be irrigated in purulent exudations. Drainage is established by means of a strand of iodoform gauze. The author recommends this procedure as the safest and best in all cases of pericardial exudation, and maintains that the adhesions within the sac are less extensive than when the effusion has been absorbed spontaneously. The operation should not be undertaken in cases of chronic or relapsing pericarditis, for these are likely to be attended with formidable adhesions. It should be restricted to the suppurative form, and to those acute cases in which a serous exudation is rapidly poured out, to the danger of life.

OBSTETRICS AND GYNÆCOLOGY.

UNDER THE CHARGE OF

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SOURCES AND DIAGNOSIS OF PYURIA.

An important article by H. A. Kelly on this subject appears in the *Med. News*, Phila., 6th December. He considers the source of pus in the urine may be grouped as being derived from the urethra, bladder, kidney and ureter, and extra-vesical. From the urethra it may arise—(1) In Skene's glands, (2) from a sub-urethral abscess, (3) from the urethral wall itself, urethritis or urethral ulcer. The vesical sources are cystitis, ulceration, and foreign bodies in the bladder. Extravesical sources include ectopic gestation, intestinal fistula, extension of uterine cancer, and pyosalpinx.

The diagnosis, when arising from Skene's tubules, is made by pressing them up under the pubic arch, and squeezing downwards and outwards, while the use of two glasses will demonstrate a urethral origin, pus being found in the first urine passed, and being absent later. When vesical, the diagnosis can be made by the cystoscope, which also is of value in demonstrating the presence of extravesical abscesses which have ruptured into the organ, the mucosa surrounding the opening having a red, œdematous, mammillated appearance. When a pus collection is situated in a ureter or kidney, the urethral orifice is usually seen red and inflamed; while, by catheterisation of the ureters, the exact site of the disease may be ascertained. In performing a cystoscopic examination, the author recommends the genupectoral position, and strongly emphasises the advantage of allowing the free entrance of air into the vagina before distending the bladder.

ACUTE STRANGULATION OF PROLAPSED UTERUS.

Two cases of this extremely rare complication are recently recorded. One is described by Baldy (*Am. Journ. Obst.*, N. Y., February 1898). The patient, æt. 70, when seen before strangulation occurred, showed the usual signs of prolapsus uteri with superficial ulceration of the cervix, but complained that, though the displacement had been present for over ten years, for the last few months it had become distinctly aggravated. Operation was recommended. Ten days later the patient became worse, the mass having increased greatly in size, and gave rise to intense pain. On examination, the protruding tumour presented a dark purplish appearance, and the ulceration was seen to have extended enormously, involving fully half of the swelling. The constitutional symptoms were also extremely anxious.

With the greatest difficulty the protrusion was reduced, and the patient was subsequently given a large hot douche of several gallons of water, at 110° F., which gave much relief to her distress. The douches were continued daily till the ulceration disappeared, and the parts had resumed their natural colour and appearance. It was then decided to perform hysterectomy by the abdominal method, with the object of amputating the uterus low down at the neck, and stitching the stump of the cervix to the ovarian stump. This was, however, frustrated by the presence of a solid tumour, the size of a hen's egg, attached to the supravaginal cervix, and burrowing into the connective tissue behind the vagina. Complete hysterectomy was therefore performed, and after closure of the vaginal roof it was stitched to the ovarian stumps. After closure of the abdominal wound, this operation was supplemented by an anterior colporrhaphy and perineorrhaphy. The patient made an excellent recovery.

A second similar case is recorded by Beyer, in which the patient, æt. 22, had suffered for six years from prolapsus uteri, which for the last four years had been irreducible by ordinary means, and for which she would not allow any operative measures to be taken. Suddenly she was seized with a severe chill, associated with much abdominal tenderness, followed by persistent vomiting and constipation. On admission to hospital six days later, she presented an extremely grave appearance. On inspection, a reddish-blue mass the size of a child's head was seen protruding from the vulva. The cervix and posterior vaginal walls were covered with ulcers whose edges were surrounded by a pseudo-membrane, while from the cervical canal there exuded a free serous or mucous discharge. After a prolonged application of hot fomentations to the protruding mass, and a free evacuation of the bowels and bladder, attempts at reduction were made, but in vain. It was therefore determined to perform vaginal hysterectomy, which was easily accomplished. It was noticed at the operation that the loops of intestine in the pelvis were congested and covered with lymph. The uterus was considerably but not excessively enlarged, and its walls were infiltrated with small abscesses. The Fallopian tubes and ovaries appeared healthy. The pelvis was drained through the vagina by means of two Mikulicz drains. After the operation the vomiting gradually ceased, but the patient became restless and delirious. In the course of forty-eight hours the vomiting returned, the pulse became more frequent, and the temperature higher, till finally the patient died on the fifth day.

An investigation shows the literature of the subject to be extremely meagre, but the author specially cites a similar case recorded by Monro in the *Trans. Edin. Obst. Soc.*, which occurred in a child 3 years of age.—*Am. Journ. Obst.*, N. Y., February 1890.

COMPLETE INVERSION OF THE UTERUS FOLLOWING ABORTION.

SWITALSKI (*Centralbl. f. Gynäk.*, Leipzig, 1898, No. 3) records the case of a woman, æt. 36, who had four normal labours—and aborted at fifth month, followed by excessive hæmorrhage and inversion of the uterus. Attempts at reduction under anæsthesia, after the methods of Kiursch and Emmet, failed, but had the effect of producing an extensive laceration in the anterior cervical wall. An opening was made into the pouch of Douglas through the posterior fornix, when it was found that the entrance to the cup-shaped depression was so narrow as scarcely to admit the point of the finger. An incision (after Küstner) was made through the posterior uterine wall, commencing 2 cms. above the external os, and reaching to 2 cms. from the fundus, allowing the latter to be easily reinverted. The uterus was then brought into the vagina, through the opening into the posterior fornix, and the wound on the posterior wall sutured with sublimate catgut.

Microscopic examination of pieces of mucous membrane and muscular tissue, removed previous to reinversion, showed changes similar to what one would expect to find as a result of long-continued vascular and lymphatic engorgement.

Switalski refers to two other cases, one following an abortion at the fifth month, the other at the fourth; in the latter the inversion occurred after the expulsion of the placenta three weeks after that of the fœtus.

He suggests that before beginning manual reposition it is well to ascertain the condition of the cervical wall, as, on account of its thinness from muscular degeneration, it is apt to tear. Reference is made to the uncertainty and danger of Thomas' operative treatment of such cases, and Switalski gives preference to Polk's method of opening the vesicouterine fold of peritoneum, incising the constricting ring at the entrance of the funnel-shaped depression, and then reinverting the uterus.

THERAPEUTICS.

UNDER THE CHARGE OF

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The Value of Cold Bathing in Typhoid Fever.

Hare and Holder (*Therap. Gaz.*, Detroit, March 1898) contribute a long statistical and clinical paper on this subject. They point out that the mortality from typhoid fever has been steadily diminishing since 1851, and that this is due partly to the extended recognition of mild cases, and partly to improved sanitation, better hospital accommodation and nursing, and less meddlesome methods of treatment. In connection with the advocacy of cold bathing as a method of treatment, it is frequently stated that it has reduced the mortality from 25 to 7 to 10 per cent. in those countries where it has come largely into vogue, but the authors show that nowhere has a mortality of 25 per cent. been met with for many years, and that these statistics were collected in France and Germany many years ago, and are not applicable to present circumstances. The average to-day is certainly not more than 15 per cent. all over, and is considerably less in certain districts and hospitals. Taking 27,116 cases treated on general principles in hospitals in America, England, France, Germany, and Switzerland, the mortality only amounted to 10 per cent., 7·5 being the lowest and 14·6 the highest percentage recorded. Hence, in comparing the results of the cold bath treatment in hospital practice with those obtained by general methods, comparison should be made as against a mortality of 10 per cent. in the latter case. At Basel in 1873, under the cold bath treatment, there was a mortality of 10·4 per cent., while in the same year at Glasgow, under general treatment, the mortality was 9·4, and at Homerton 9·6 per cent. The authors show also that in Philadelphia and New York, according to available statistics at least, the death rate under different methods of careful treatment did not vary much. Brand's figures as to the low mortality consequent on systematic cold bathing, are derived from German military hospitals in times of peace, where the patients have been previously in vigorous health, and where all the circumstances tend to a mild course of the disease. The bath produces a lowered temperature, an improved circulation, an elimination of toxic matters by an increased determination of blood to the skin and kidneys, and an improved nervous tone by lessening the fever and removing the toxins. It also seems to induce a very considerable increase in the number of leucocytes. As against this there is the unpleasant shock which it produces, and the undoubted strain thrown on the patient by the operation. They hold that in no case should its systematic use be a routine one, and that its invariable application to all cases admitted into certain hospitals is a mistake. Under any circumstances it is simply a symptomatic treatment, and should never be awarded a higher therapeutical position. In conclusion, they advise the following rules as suitable for the great bulk of cases:—

1. When admitted early in the disease, with constipation or mild diarrhœa, a full dose of calomel should be given.

2. Control the fever, when it reaches 102° F., by sponging. The patient is laid in bed on a rubber sheet with a blanket over it, and rapidly sponged with water at a temperature adapted to his needs. He may be rubbed over with ice or ice-cold water. Under this treatment the skin is always red, not blue as it sometimes becomes in the cold bath, and there is no danger of collapse. If this does not bring the temperature down to 101° F. in twenty minutes, resort may then be had to the bath.

3. It is advisable to use moderate friction or massage, as this improves the skin circulation and tends thereby to reduce temperature.

4. In nearly all cases, give more nourishment than the average typhoid patient has usually had in the past. With the exception of broths and meats, almost any article easy of digestion should be allowed, such as one or two or more lightly-boiled eggs, corn-starch, arrowroot, etc.

5. Use stimulants in carefully graduated doses whenever the circulation needs them, particularly alcohol.

Acute Sulphonal Poisoning.

Hoppe-Seyler and Ritter report a case of fatal poisoning with sulphonal (*München. med. Wchnschr.*, 1897). The patient was a lunatic, æt. 23, in good bodily health, who swallowed some time during the evening 1⅔ oz. sulphonal. Only next day was he observed to be greatly excited; but he gradually became comatose, and in the evening he was in a deep stupor, not reacting to nipping or pricking with a pin. The temperature was 102°·2 F., he was cyanotic, pulse small and over a hundred beats per minute, heart sounds weak. The bladder was greatly distended, and the urine on being drawn off was reddish yellow in colour, and contained a trace of albumin, a quantity of urobilin, but no hæmatoporphyrin. Next day he was still alive, but deeply insensible, and death occurred with gradual heart failure about seventy hours after taking the poison. Treatment produced no effect on his condition, but it was invoked too late. On section there was œdema of the lungs, thrombosis of some of the vessels, and large ecchymoses in the pleura, a few in the stomach, and many in the intestine. The epithelial cells in the liver and kidney were slightly necrotic, and there was siderosis in the liver. Pure sulphonal was found in the urine. The symptoms and post-mortem appearances differ greatly from chronic sulphonal poisoning, but in the latter they arise very largely from the destruction of the red blood corpuscles rather than directly from the sulphonal. This point was settled by comparing the results of a number of experiments on animals.

Thyroid Gland Treatment.

In the March issue of this Journal attention was drawn to Hermann Munk's views as to the current clinical and physiological teaching in regard to the thyroid gland. Winkler (*Centralbl. f. Therap.*, April 1898) admits that previous experimenters on the subject may have come to too hasty conclusions, but holds that, in face of the therapeutical results (obtained otherwise than in myxœdema, where its value is unquestionable), judgment must be held over. Wormser (*Arch. f. Physiol.*, Leipzig, Bd. lxvii.), as the result of numerous experiments on animals, has come to the following conclusions:—Iodothyrin, obtained from the thyroid glands of pigs and sheep by different methods, is not capable of averting tetany and death in dogs from which the thyroid gland has been removed. Nor does the addition to the iodothyrin of the albuminous substances of the gland have any better effect. The remaining substances (extractives, etc.) were also inactive. Iodides and iodine-containing substances also showed themselves powerless in this respect. Dried thymus or suprarenal gland had no effect.

Wormser, however, in contradiction to Munk, found that the whole gland dried prevents the symptoms which usually arise after thyroidectomy.

A considerable number of cases have now occurred in which glycosuria arises under the administration of thyroid preparations. Von Noorden has met with it in five cases out of seventeen treated for corpulence, and it has been reported in cases of psoriasis, myxœdema, and even in one case where it was being taken experimentally. Its occurrence in animals fed on thyroid glands is not uncommon.

On the other hand, Branthomme (*Rev. de méd.*, Paris, December 1897) reports a case of glycosuria cured by its use, in a man æt. 52, who had had sugar in his urine for eleven years. Before getting thyroid tablets he was passing 6 litres of urine per day, with 228 grms. sugar and 1 grm. albumin. In nine days there was very distinct improvement; two months later the daily urine had fallen to 1½ litre, the sugar to 8·7 grms., and the albumin to 0·09 grm.; and eight months later the sugar had entirely disappeared, and there was a mere trace of albumin. In reference to this case, Lépine draws attention to the statement of d'Arsonval and Charrin, that electric currents of high tension increase tissue metabolism, and also improve certain cases of diabetes, but, on the other hand, are capable of inducing glycosuria in the healthy. Their action in this respect seems to have certain resemblances to that of thyroid preparations. In a case of glycosuria, where the patient was corpulent, Lépine found that thyroid treatment first increased the sugar, but after a few days diminished it considerably, and at the same time the general condition improved.

PATHOLOGY AND BACTERIOLOGY.

UNDER THE CHARGE OF

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Chronic Ulcerative Gastritis.

Nauwerk (*Gaz. méd. de Liège*, Oct. 7, 1897) describes a case illustrating this condition. The patient was a very stout woman, æt. 60, greatly addicted to over-feeding, and frequently indulging in indigestible foods. She had suffered from eructations and other symptoms of gastric catarrh for several years. Hæmatemesis was only observed once, three years before her death. The latter was caused by peritonitis, which post-mortem examination showed to have been caused by perforation of the stomach. Two small perforations were seen on its peritoneal coat, due to the penetration of two separate ulcers. Several other ulcers of a more superficial character were seen in other parts of the mucous coat, which showed generally a well-marked catarrh. These two processes, the inflammatory and the ulcerative, seemed to be related to and not independent of one another. Microscopic examination disclosed several other earlier foci, showing superficial necroses, a pre-ulcerative stage of an approximate depth of 1 mm. No emboli could be found in any of the vessels supplying these areas, and there was nothing to support the possibility of their being infarctions. The author could likewise find no evidence of their being of bacterial or anæmic origin. They resembled rather the result of some corrosive poisons, and he came to the conclusion that they were a further result of the inflammatory process. He therefore thinks that most cases of chronic catarrh of the stomach are really cases of chronic ulcerative gastritis. This is no doubt partially true, but not in the sense that the author seems to indicate. It is well known that superficial ulcers are frequently present in gastric catarrhs. These have little or no tendency to penetrate deeply, as happened in his case, and are generally readily healed by appropriate treatment.

The Parathyroid Glands and Exophthalmic Goitre.

Edmunds was the first English writer to draw attention to the importance of experimental research upon the parathyroid glands, and in January of this year, Welsh (*Journ. Anat. and Physiol.*, London, Jan. 1898, vol. xxxii.) published the first of a series of papers on this subject. It is an able historical and critical account of the anatomical and experimental work which has been done, up to the present time, and is to be followed presently by the results of the author's own valuable observations and experiments in the same field. Edmunds (*Journ. Path. and Bacteriol.*, Edin. and London, Jan. 1898) has now given us another contribution, which serves to corroborate his former results, and to still further extend them. The paper is elaborately, if not even extravagantly, illustrated. He found that if a portion of the thyroid gland be removed, the vesicles of the remainder enlarge, and become altered in shape from round or cubical to oblong or branched; that the lining membrane becomes convoluted, and the lining secreting cells columnar instead of cubical, and that the colloid contents of the vesicles become less viscid and more watery. These changes appear to be identical with those found in the enlarged thyroid of Graves's disease; hence it may be inferred that the typical change found in the enlarged thyroid in Graves's disease is of the nature of a compensating hypertrophy. Previous division of nerves has no effect upon these changes, and hence the enlarged thyroid of Graves's disease is not primarily of central origin. A number of experiments were performed upon dogs, with a view to further determining the function of the parathyroid glands. If a single parathyroid and a minute piece of thyroid proper were left, no symptoms of any kind appeared, whereas death followed if the parathyroid was subsequently excised, although the small piece of the thyroid proper was left. The excision of the parathyroids would thus appear to be the cause of the acute symptoms (tremors, rigidity, convulsive attacks of dyspnœa, and death) which follow the total excision of the thyroids, and that the excision of thyroid proper causes only the symptoms of myxœdema. Further, the parathyroids of dogs have as much, or more, to do with saving them from acute myxœdema as the thyroid proper. The effect of feeding thyroidless monkeys with the extract from the thyroids of sheep was also tested, and it was found that the symptoms were kept off or relieved for a time, but that it did not, as a rule, save their lives. Some of the dogs in which a single parathyroid and a minute piece of thyroid proper were left, were kept alive for several months, in one case for nearly a year, to see if the parathyroid developed into thyroid tissue proper; but it failed to do so. The cells became more definitely arranged in rows, small collections of secretion were seen, and the trabeculæ of connective tissue were thickened, but no nearer approach was made to true thyroid tissue.

Brissaud, in an interesting paper (*Presse méd. Belge*, Bruxelles, 1st Jan. 1898), applied the facts gained by anatomical and physiological research to the human subject, and suggests that there are two distinct forms of myxœdema—(1) A form depending upon the destruction of all the thyroid apparatus, both parathyroid and thyroid, and for this suggests the name thyroparathyroïdien; (2) a form due to the destruction of the thyroid gland itself, the parathyroids being left intact, and for this suggests the name myxœdème thyroïdien. Gley has made a further interesting contribution to the same subject (*Presse méd. Belge*, Bruxelles, 12th Jan. 1898), in which he mainly supports Brissaud's conclusions.

THE INFLUENCE OF PATHOLOGICAL CONDITIONS ON ACTIVE ABSORPTION OF OXYGEN BY THE LUNGS.

LORRAIN SMITH and Haldane brought forward, towards the end of last year (*Journ. Physiol.*, Cambridge and London, 2nd Nov. 1897), some interesting facts regarding the absorption of oxygen by the lungs, and the former worker has lately (*ibid.*, Feb. 1898) published a fitting sequel to the previous excellent paper. It deals directly with the effect which abnormal states that affect the body as a whole—such as fever and gross changes in the lung tissue itself, such as exudation into the alveoli—exert upon the oxygen absorption by the lung. The method applied in this research is identical with that employed in the former, namely, by measuring the tension of oxygen in the blood circulating in the lung capillaries, by saturation of the hæmoglobin with carbonic oxide. The great majority of the experiments were carried out on mice, since fever can be induced in them with great ease, and since exudation into the alveoli of their lungs can be readily brought about. He comes to the following conclusions:—(1) The oxygen tension of the arterial blood leaving the lungs is lowered to about that of the alveolar air by the general pathological processes which ordinarily occur in fever, and in particular by rise of body temperature, and by toxic agents of bacterial origin. (2) The oxygen tension is lowered by pathological changes occurring in the lungs locally, as a result of irritation by high-pressure oxygen. (3) Among the experiments here recorded, the lowest tensions observed in the cases where the animal suffers from some general condition are on the whole higher than the lowest tensions observed when the local changes in the lungs have been produced. (4) The observations show that interference with active absorption through the lung epithelium forms an integral part of many conditions of disease, directly or indirectly associated with the lungs. (5) The fact that such pathological conditions tend to reduce the oxygen tension of the arterial blood to about that of the alveolar air, affords striking confirmation of the conclusion, that the absorption of oxygen by the lungs is an active physiological process, and cannot be explained as due simply to diffusion.

TUBERCULOSIS OF THE MYOCARDIUM.

HAND discusses this subject (*Proc. Path. Soc. Philadelphia*, 15th Feb. 1898), and records two cases of his own, both occurring at the age of 5½ years, the one in a boy and the other in a girl. This raises the total of reported cases to forty-two. The former showed a large tubercular mass about the size of a hickory-nut, and the latter a millet-seed-like body in the ventricular septum. Occasionally another form, a diffuse tubercular sclerosis, is seen. The ventricle is the commonest site. Most of the cases are, like the author's, secondary, but Demme and Knopf considered theirs to be primary. The symptoms are often wanting or lost in those of the general disease. When they are favourably seen they arê dyspnœa, gallop-rhythm, tachycardia, brachycardia, arhythmia, palpitation, and cyanosis. The method of transmission is apparently in most cases from the mediastinal glands, through the lymph channels. At other times it is through a general blood infection, and at others by an extension from the pericardium. The microscopic appearances are generally typical enough, though the tubercle bacilli may be few in number.

DISEASES OF THE EAR, NOSE, AND THROAT.

UNDER THE CHARGE OF

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THE NASAL ACCESSORY SINUSES.

The antrum of Highmore.—Experience has shown that many cases of maxillary empyema may remain unhealed for years, even after apparently efficient surgical treatment had been carried out; and it is further often a matter of considerable difficulty to say when a cure has been effected. It is unnecessary here to detail the ordinary procedures that are now adopted for opening and draining the antrum of Highmore; we would rather draw attention to the method of dealing with some of those obstinate cases which have resisted previous treatment. It is evident that merely opening, washing out, and draining a cavity with rigid bony walls lined with granulation tissue and polypi, and possibly affected with carious areas of bone, must be insufficient treatment. A more thorough inspection of the whole cavity should be obtained, and radical measures adopted for dealing with the existing condition. Küster (*Deutsche med. Wchnschr.*, Leipzig, 1889), in order to effect this, resected the outer facial wall of the antrum, after raising the soft tissues of the cheek and the periosteum. By this subperiosteal method, fresh bone was re-formed and the cavity again closed. Jansen of Berlin (*Arch. f. Laryngol.*, 1894, Bd. i.) laid the cavity open in the most thorough way, by removing the whole outer wall with chisel and bone forceps. In this way the whole cavity can be inspected with the aid of a good light, a method of examination which is superior to that which is obtained by the touch of the finger or the probe. The condition which may be found varies in different cases; in some, the lining mucous membrane may appear fairly normal, with areas of granulation tissue here and there, and perhaps some carious bone in association with the root of a tooth; here scraping of the affected areas is sufficient treatment. In other cases, again, the whole lining membrane may be converted into granulation tissue, and in some parts actually a polypoid condition may be met with. The whole cavity must be scraped and the diseased mucous membrane removed. The antrum is then plugged with iodoform gauze.

Bönninghaus of Breslau (*Arch. f. Laryngol.*, 1897, Bd. vi. Heft 2) deals at some length with the treatment of these obstinate cases of antral suppuration. Where the whole lining membrane of the cavity has been removed, healing and cicatrisation are often considerably delayed, because the surface growth of epithelium and the growth of granulations do not take place at one and the same time. If the epithelium is slow in advancing, the granulations grow too strongly. In order to prevent this, he seeks to increase the line of growth of the epithelium, and for that purpose he resects the osseous nasal or inner wall of the antrum, and then invaginates the nasal mucous membrane into the cavity, so that half or more of the sinus is covered with healthy mucous membrane; the remainder is covered by fresh epithelium, which grows from the edge of this and from the opening in the mouth. In operating for this purpose, he removes the outer wall of the antrum and deals with its interior in the manner we have already indicated. The second stage of the operation is then undertaken—the nasal wall is now resected. This is attacked from its outer or antral aspect with the aid of a good light. Having ascertained by palpation the line of junction between the lower and more bony part of the wall, and the upper more membranous part, a line corresponding to the attachment of the inferior turbinated bone, he chisels and removes the bone below this line, taking care not to injure the nasal mucous membrane upon its other surface. By chisel and forceps all the bone is carefully removed, save the anterior and upper corner, where the tear duct lies. The nasal mucous membrane, which now forms the only partition between the nasal fossa and the antrum, is invaginated into the latter, and is kept in position by strips of iodoform gauze, which are introduced through the nose; care, however, being taken to keep the nose as free as possible for respiration. The wound is also plugged from the mouth, and after four or five days the gauze tampons may be removed, as the mucous membrane has already become adherent. The wound in the mouth is kept plugged, and the cavity is syringed morning and evening. His paper concludes with an account of three cases.

Frontal sinuses and ethmoid cells.—The most common from of suppuration met with in these cavities is undoubtedly the chronic or latent form of empyema; as, anatomically, these regions are so closely related, as suppuration so frequently exists in both at the same time, and as treatment must consequently be directed to both, we may refer briefly to certain operative methods dealing with both regions. Similar changes are met with in their lining membrane to those described in the maxillary antrum. It is impossible to deal satisfactorily with granulation tissue and polypi in the frontal sinus through the intranasal route, as a more thorough and a more direct inspection of the cavity is necessary, and this can only be obtained by an external opening. With regard to the skin incision, two points require attention, namely, sufficient access to the cavity or cavities through it, with the minimum of disfigurement to the patient. The existence of disease on one or both sides, the presence of large or small cavities, and the kind of operation that is proposed, will naturally influence the length and situation of the incision that is made. The mesial vertical incision practised by Ogston of Aberdeen in 1884, and which has since been so strongly advocated by Mayo Collier and others, permits of both sinuses being dealt with, and in the hands of those who have used it only, it appears to give adequate access. A simple horizontal incision may be made along the eyebrow, extending from the root of the nose to the middle of the supra-orbital margin; or a combination of these two incisions, meeting below at the root of the nose, permits of a flap of skin and periosteum being raised on one or both sides, as the case may be, and the whole of the anterior wall may be thus exposed. Disfigurement from the presence of a scar may be very slight, but varies according to the manner in which the skin wound heals.

In order to deal in a radical way with the diseased sinus, Nebinger, in 1890, exposed the sinus through a horizontal incision along the orbital margin, opened the anterior wall in such a way as to obtain a thorough inspection of the cavity, and then scraped the mucous membrane, and if necessary enlarged the fronto-nasal aperture. Kuhnt in his elaborate monograph on "The Inflammatory Affections of the Frontal Sinuses," published in 1895, suggested and practised the removal of the entire anterior wall of the sinus, clearing away at the same time the whole mucous lining, not only from the cavity itself, but from the upper part of the fronto-nasal duct, thus ensuring, as far as possible, a freer drainage into the nose The bony edges were bevelled as far as possible, to reduce the depth of the cavity. Jansen of Berlin in 1893 (*Arch. f. Laryngol.*, Bd. i. Heft 2), recognising the common complication of ethmoid suppuration, and the possibility of re-infection of the frontal sinus from this source if not properly dealt with, sought to reach both cavities by completely removing the floor of the frontal sinus. Through a crescentic incision, carried upwards and outwards below the eyebrow from the lateral wall of the nasal root, the soft parts are divided, the periosteum is raised, and the floor of the sinus is freely exposed in the orbital cavity. The eyeball is drawn downwards and outwards by a blunt retractor, and with chisel and forceps the whole floor of the sinus as far as the aperture of exit is taken away. If the sinus is a small one, this suffices; but when the cavity is large, a small portion of the anterior wall, along with the supra-orbital margin, is also removed. The interior of the cavity is then scraped, though it is sometimes difficult through an opening in this situation to reach the upper part of a high sinus. The advantages which he claims for this operation are, that free drainage is readily established through the nose, and the ethmoid cells at the same time are dealt with. In one case, indeed, he was able to ascertain the presence of pus in the sphenoidal sinus, which he laid open by removal of its anterior wall. After the operation, the orbital fat rises into the cavity, and diminishes in a marked way the size of the wound surface. The globe of the eye does not suffer. mobility of the upper lid is quickly established, and the scar is frequently drawn beneath the lower margin of the anterior wall of the sinus, and thus disfigurement is avoided.

The question of drainage in the after-treatment of frontal sinus suppuration is an important one. While many[1] are in favour of establishing a free channel into the nose, the opinions differ as to the exact means of effecting this. As a rule, a drainage tube of some form is used, but the manner of its insertion is not always the same; it may be buried in the sinus, its upper extremity provided with a flange resting upon the fronto-nasal aperture, and thus prevented from slipping down into the nose, a procedure which is adopted in the Ogston-Luc operation. On the other hand, the upper end of the tube may be left to project through the skin wound for a few days, so that the cavity may be syringed through it. By the former method, the skin incision may be accurately stitched throughout its whole length, and the scarring thus reduced to a minimum, while the risks of possible re-infection from without are prevented. Nevertheless, where the tube is buried, there is a risk of pus re-accumulating in the cavity, with subsequent breaking down of the cicatrix. It has been suggested by some that the tube should be abolished, as it acts as a source of irritation, stimulating the growth of granulations and the production of pus. It has been proved, however, that the removal of a portion of the floor of the frontal sinus and the opening up of the infundibulum are insufficient means in themselves to allow of efficient drainage.

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[1] Kuhnt is an exception.

Many of the points already referred to are dealt with by Milligan in a recent paper (*Lancet*, London, Feb. 19, 1898). This work is of value, on account of the large experience of cases of frontal disease upon which the writer's remarks are based. An excellent illustration is furnished of the almost constant co-existence of suppuration in one or more of the other sinuses. Out of fifteen cases of frontal sinus suppuration operated upon through an external opening, fourteen had neighbouring accessory cavities similarly involved. The figures may be quoted in detail. In thirteen cases, suppuration was unilateral; in two, bilateral; in five, the right frontal sinus was affected; and of these it was found that the maxillary sinus of the same side was affected in two instances, and the ethmoid cells of the same side in two. In twelve cases of left-sided frontal empyema, the antrum of the same side contained pus in five, and the ethmoid of the same side was involved in a like number. In both cases of double frontal empyema, suppurative ethmoiditis was present on both sides. In one instance of right frontal suppuration, the left maxillary antrum was involved; while in one instance of left frontal empyema, both antra contained pus. In two cases of left-sided frontal inflammation, the ethmoid cells on both sides were diseased.

The author summarises the indications for operating through an external opening as follows—(1) Retention of pus within the sinus, unrelieved by simple and intranasal methods, *e.g.* leeching, irrigation, etc; (2) the persistence of a purulent discharge from the region of the sinus, after the exclusion of the participation of other accessory sinuses in the production of the discharge; (3) the presence of symptoms of cerebral irritation or of cerebral compression; and (4) the presence of severe neuralgic pains with accompanying impairment of general health. In all his cases he employed the vertical mesial incision, and preferred the gouge and mallet to the trephine saw in dealing with the bone. He insists upon the necessity of establishing free drainage through the nose, and accomplishes this by removing a portion of the floor of the sinus with a gouge or sharp spoon, at the same time breaking down the ethmoid cells, and thus the associated suppuration there is in part dealt with. In regard to the question of the kind of drainage tube to be used, Milligan adopts the rubber one as the most efficient; by means of a small flange at the upper end, it is prevented from slipping from the floor of the sinus into the nose. In reference to this important point of closure of the skin incision at once, the author's words are worth quoting:—"There can be no doubt about the utility of this method in acute and in semi-acute cases, and even in latent empyemata I believe it to be the best plan, although there is an undoubted risk of re-accumulation of pus within the sinus, of a breaking down of the cicatrix, and of the formation of a small fistulous track. Still the advantages of an immediate closure of the wound and of subsequent intra-nasal treatment make it worth while, I believe, to run these several risks."

Sphenoidal sinus.—As we have confined our remarks in dealing with the other sinuses only to those operations which we performed through an external opening, we will not refer here to the methods of opening the sphenoidal sinus through the nose. A brief reference may be made to an operation carried out by Jansen (*op. cit.*), where the sphenoidal sinus was exposed and opened through the wound which he made, in order to deal with the frontal sinus and ethmoid cells, as already described. Having diagnosed the presence of pus in the sphenoidal cavity, he removed its anterior wall. The same author has also opened this cavity through the maxillary sinus by breaking through the posterior wall of the latter, so as to enter the sphenoid directly by this route.

PUBLIC HEALTH.

UNDER THE CHARGE OF

CHARLES HUNTER STEWART, M.B., D.Sc.,

DEMONSTRATOR OF PUBLIC HEALTH, UNIVERSITY OF EDINBURGH.

Disinfection by Formaldehyde.

Though the bactericidal properties of formaldehyde were first determined more than ten years ago, it is only during the last two or three years that its suitability as a means of disinfection on a large scale has been studied. Formic aldehyde is the first stage in the oxidation of methylic alcohol into formic acid, and its disinfecting power is probably dependent on its further oxidation into this acid. Several ways have been proposed for its production as a disinfectant, and each of these has its advocates. Whether in solution or in the gaseous state, it is very pungent and irritating to the mucous membrane of the nose, eyes, and throat. Its marked property of deodorising fæcal matter, etc., depends on its power of forming odourless compounds with such substances as sulphuretted hydrogen, methyl mercaptan, scatol, and ammonia bases. In commerce a 40 per cent. solution is met with under the name of formalin. Walter (*Ztschr. f. Hyg.*, Leipzig, Bd. xxi. Heft 3) found that a coat thoroughly sprinkled with a water emulsion of *Staphylococcus pyogenes aureus*, and then sprayed with a 3 per cent. solution of formalin, was, after standing six hours, quite sterile. Experimenting with it as a gaseous disinfectant, he used pastilles made of kieselguhr soaked in formalin, which, on being heated, gave off formaldehyde. Silk fibres infected with anthrax spores were used as test objects. When exposed moist in a bell jar to the gas for three days, the spores were killed. If the fibres were dried, it took five days. The presence of moisture was therefore important, as is known to be the case in disinfecting with chlorine or sulphurous acid. Clothing, leather articles, etc., could be disinfected in twenty-four hours without harming their appearance. Fæces with a 1 per cent. solution of formalin were at once deodorised, and with a 10 per cent. solution were made sterile in ten minutes.

G. Roux and A. Trillat (*Ann. de l'Inst. Pasteur*, Paris, tome x.) applied this gas to the disinfecting of living-rooms. They produced the gas by heating formalin. It had previously been found that simple heating was not satisfactory, as at this temperature a large amount of the formaldehyde evolved was formed into an inactive polymer. To prevent this, they devised a special apparatus, now much used under the name of the Formaldehyde Autoclave. The polymerisation is prevented by adding to the formalin from 4 to 5 per cent. of its weight of chloride of calcium—a very hygroscopic salt. The autoclave is three-quarter filled with this, and its cover closed. Heat is applied, and when the pressure reaches three atmospheres the gas escapes by a narrow tube or jet. By connecting this with a hole in the door of the room to be disinfected, the operation can be carried on from the outside. The dust on the floors and walls of a room, 400 cubic metres capacity, was distributed into twelve flasks, and then placed in different parts of it; 10 litres of the formalin mixture were used in the autoclave, which worked for four hours; fifty hours later the contents of all the flasks were sterile. For official disinfections they suggest that small portions of silk, soaked in a solution of fuchsine, be placed in different parts of the room. Since formaldehyde changes the red colour into a blue-violet, these will show if the disinfectant has been thoroughly diffused. The higher the temperature of the room, the more certain was the germicidal action of the gas.

Bosc (*ibid.*) exposed small pieces of cloth containing virulent cultures of *Bacillus diphtheriæ*, *coli*, spore-bearing anthrax, *Staphylococcus pyogenes aureus*, etc., in different parts of the floor, wall, and ceiling of a room of 740 cubic metres capacity, and used 4 litres of formalin mixture in the autoclave. Some of the specimens were moist and some dry, yet after twenty-four hours he found that all were sterile, showing that the formaldehyde had acted with equal efficiency at all parts of the room. Cultures placed in folded bed-curtains, or in mattresses, were not sterilised by this treatment, though *Staphylococcus pyogenes aureus* placed in the pocket of a coat was killed. Even moist tuberculous sputum, spread on cloth to a thickness of 1½ mm., was sterilised. After two hours of ventilation there was no smell apparent, even though one closed the room. Vaillard and Lemoine (*ibid.*) give the results of experiments carried out at the request of the French Minister of War. In a hospital ward of 660 cubic metres capacity, and using 15 litres of formalin in the autoclave, after six hours all non-spore-bearing pathogenic organisms were killed, but even after twenty-four hours the spore-bearing organisms were not sterilised. They consider gaseous disinfection with formaldehyde, while superior to spraying with sublimate, is only a surface disinfectant, and cannot be used for body or bed clothing, etc. For these steam is the only efficient method.

Pfuhl (*Ztschr. f. Hyg.*, Leipzig, Bd. xxiv. Heft 2) in the main confirms these results. He points out that more than 1 per cent. of methyl-alcohol in the formalin lessens the efficient production of formaldehyde in the autoclave, as the latter forms with methyl-alcohol an inert body, methylal. When the disinfection is completed, he recommends that the windows and doors be opened, and dishes containing solution of ammonia be put on the floor. With these precautions, the room may be used two hours later without discomfort.

Aronson (*ibid.*, Bd. xxv. Heft 1) considers the cost of Trillat's autoclave prohibitive, and the danger in its use objectionable. He recommends the use of pastilles made of solid polymerised formaldehyde (trioxymethylene). Each pastille weighs 1 grm., and contains 100 per cent. formaldehyde, which is evolved by heating on a quite simple apparatus. After carefully closing all crevices in the room, the lamp of the apparatus is lit, and then the door closed, just as in disinfecting with, say, sulphurous acid. By burning one pastille for each cubic metre of room space, he found that all non-spore-bearing organisms placed in any part of the room, were killed after twenty-four hours. As regards power of penetration, his results agree with those of Vaillard and Lemoine. He considers it a most valuable means of disinfecting rooms, and also of bed and body clothing, if these be hung freely in the room, so as to permit of the disinfectant getting into direct contact with them. If the gas be developed in small quantity, he thinks it a good means of deodorising bad-smelling rooms.

Strüver (*ibid.*, Heft 2) determined the yield of the different apparatuses in use, by passing the formaldehyde produced into solution of ammonia. From the change in the titre of this solution he was able to calculate the amount of formaldehyde produced. For his disinfection experiments by the autoclave he used a solution composed of 1 litre formalin, 200 grms. chloride of calcium, and 400 c.c. of water. This contained 25 per cent. of formaldehyde. Cultures of typhoid bacillus on threads of silk or on linen placed at different parts of the room, and even when covered with several layers of flannel, were sterilised after twenty-four hours, when the air of the room contained ·12 per cent. of formaldehyde. Spore-bearing anthrax bacilli under two layers of flannel required about ·2 per cent. Dr. S. Rideal (*Public Health*, London, November 1897), working with formaldehyde pastilles, considers that in all ordinary disinfections 10 grms. of pastilles are sufficient for 1000 cubic feet (about one-third the amount that Aronson used). In special circumstances, spraying the walls and floor with a ·5 per cent. solution of formaldehyde is necessary.

Walter (*Ztschr. f. Hyg.*, Leipzig, Bd. xxvi. Heft 3) found that by driving formaldehyde through an experimental disinfecting chamber, kept at 55° C. to 60° C. (*i.e.* by a current of the gas), clothing containing cultures of spore-bearing anthrax and of staphylococcus were sterilised in twenty-five minutes, as proved both by culture and inoculation into animals. Neither in texture nor appearance were the clothes damaged. He concludes that formaldehyde can be made to penetrate clothing. Abba and Rondelli (*ibid.*, Bd. xxvii. Heft 1) consider that from the view-point of official sanitary disinfection, it is not superior to the present recognised methods. Unless in summer, it is impossible to get the room to that temperature which ensures the germicidal action of gaseous formaldehyde. The spraying of rooms with sublimate, a much cheaper operation, is quite as effective. The persistence of the irritating fumes in the room, which makes it impossible to remain in it, much less to sleep in it, even after twenty-four hours, is a great objection, especially where there are no shelters for the occupants while their house is being disinfected. It is of distinct service, however, for superficial disinfection of substances harmed by the spray or high-pressure steam. Dr. Sprague (*Med. News*, N. Y., December 1897) describes a method for the rapid disinfection of clothing with high percentage of formaldehyde. The apparatus used was the Kinyoun Francis formaldehyde disinfector. It consists of a disinfecting chamber, to which is attached a vacuum apparatus, a formaldehyde generator, and an ammonia generator, these two latter being heated by steam. The formaldehyde is generated from a mixture of formalin and calcium chloride, the ammonia gas from a solution of ammonia. The infected clothes are put in the chamber, in which a vacuum of 15 to 20 in. is produced. Formaldehyde at high pressure is then driven in, and left there in contact with the clothing for the desired time. The mixture of air and formaldehyde is now exhausted, and ammonia gas is passed into the chamber to remove any formaldehyde left there. Air now is allowed to enter, the chamber is opened, and the clothing removed. The results given by Dr. Sprague are very interesting, but, as he himself says, not entirely satisfactory as regards cultures placed in the interior of mattresses and pillows. Further results are promised in a later paper.

GLYCERINATED CALF LYMPH.

IN the "Twenty-fifth Report, The Local Government Board (England)" there is a report on this subject by Dr. Monckton Copeman and Dr. Blaxall. Copeman almost always found, both in human and in calf vaccine lymph, one or more of the following micro-organisms:—*Staphylococcus albus epidermis*, *Staphylococcus pyogenes aureus*, and *Staphylococcus cereus flavus*, and occasionally *Streptococcus pyogenes*. He details the steps that led him to adopt pure glycerin to the extent of 50 per cent., as the best method of removing all such extraneous organisms, without in the least interfering with the efficiency of the lymph. The Royal Commission on Vaccination, having in mind the outbreak of a form of impetigo which followed on the vaccination by glycerinated calf lymph of seventy-nine children in the island of Rügen, in the Baltic, states: "That it was at one time stated that the introduction of glycerin was likely to be mischievous." Dr. Copeman discusses this, and considers that impurity in the glycerin was the cause. He insists on only the purest glycerin being used, and with this there is no danger. Dr. Blaxall investigated the comparative value of emulsions of glycerin (50 per cent.), vaseline (80 per cent.), and lanoline (83 per cent.). The glycerin used was previously sterilised, and the vaseline and lanoline were found to be sterile. In each case the vaccine emulsions were at once inoculated on agar plates, and incubated at 20° C. All the

DISEASES OF THE EAR, NOSE, AND THROAT.

UNDER THE CHARGE OF

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25th March 1898.—Dr. Edgar showed two tumours removed from the same patient—one a dermoid cyst of the right ovary, the other a multilocular cyst of the left ovary, a portion of which was dermoid. Dr. J. K. Kelly read notes of cases, illustrating difficulties both in diagnosis and operation. There were two cases of ovarian cyst, with very widespread adhesions; one of cancer of the omentum, secondary to cancer of the ovary, and simulating ovarian cyst; one of right tubo-ovarian abscess and left pyosalpinx adherent to the bowel; one of double pyosalpinx with dense adhesions; and, lastly, a case diagnosed as double pyosalpinx, where, on opening the abdomen, its interior was found to be studded all over with tubercular nodules. Both tubes were removed, and recovery was uninterrupted. Dr. J. Munro Kerr read a paper on the diagnosis and treatment of cysts of the broad ligament.

1st April 1898.—Dr. Beatson showed a tumour of the mamma, firmly encapsuled, and showing intracystic growths. It resembled fibroadenoma. Dr. Galbraith Connal showed a case of myxœdema, in a man who had recovered under treatment by thyroid tabloids. The patient dated his illness from the administration of iodide of potash, which Dr. Connal thought might have accelerated the onset of the symptoms. Dr. Beatson then showed a mass of enlarged cervical glands, excised along with a portion of the internal jugular vein. The operation was done by Senn's modified S-shaped incision, which gave a less unsightly result than the oblique incision. Dr. W. K. Hunter read a paper on the various forms of white blood corpuscles. Card specimens of malignant endocarditis were shown by Dr. Alexander Ferguson, and of a sporozoon in a fish by Dr. R. M. Buchanan.

OBITUARY.

Charles West, M.D., F.R.C.P.

By the death of Dr. Charles West, which occurred at Paris on 19th March, still another of the rapidly diminishing courtly old school of practitioners has been called to his rest, full of years and honours.

West was born at London in 1816, and, having from his earliest years entertained strong predilections for the medical profession, he was, at the age of fifteen, apprenticed to the village apothecary at Amersham.

He never regretted this early part of his medical training, and was frequently wont to declare that the abolition of the apprenticeship system was to a large extent responsible for the slipshod manner in which drugs are prescribed by the present-day practitioner. He entered himself a medical student at St. Bartholomew's in 1833, where he remained for two years, after which he studied for a year at the University of Bonn and another at Paris, finally graduating at Berlin in 1837. On returning to London, he started in practice, and established his reputation as a lecturer by delivering a course of lectures on diseases of women, at St. Bartholomew's Hospital, with which he had become connected. His lectures were largely attended and highly appreciated, not only on account of the excellent matter which they contained, but for the studied and polished language in which they were written, and for the beautifully modulated and musical voice in which they were delivered. West was indeed a born orator. The establishment of a children's hospital in London was largely due to West's influence and activity, and his name will ever be honourably and inseparably associated with the erection of the Sick Children's Hospital at Great Ormond Street. The work of establishing this hospital was to him a labour of love; and, from the time the idea first occurred to him in 1849, he devoted himself to the cause he had so deeply at heart, till at length in 1852, after many disappointments and much opposition, he had the satisfaction of seeing the hospital fully equipped and opened. From this opening day until the date of his death, forty-six years later, he continued to take the warmest interest in its welfare.

Naturally fond of children, he possessed the happy knack of quickly gaining the confidence of his little patients, who seemed intuitively and instinctively to know that they could trust him. West contributed largely to medical literature, his two best known works being "Lectures on the Diseases of Infancy and Childhood," which reached a seventh edition and was translated into nearly every European language, and "Lectures on the Diseases of Women," which also went through several editions. After severing his connection with the Children's Hospital, he felt that the most important part of his life's work was accomplished, but his interest in the profession, of which to the very end he proved himself such a devoted adherent, never flagged, and during the last year of his life he published his address on "The Profession of Medicine: its Study and Practice, its Duty and Rewards."

ANALYTICAL REPORTS.

SOMATOSE AND IRON-SOMATOSE.

BAYER & Co. of Elberfeld, Germany, have forwarded samples of these well-known preparations, preparations which have caused a very considerable amount of interest among German scientists. Somatose is a remarkably pure albumose isolated from the products of the digestion of meat, in the form of a very fine, almost impalpable, yellow-white powder, extremely soluble in water. In solution it has a pleasant flavour, and gives no precipitate.

	Analysis. Per Cent.
Water	10·36
Total solids	89·64
Ash	7·56
Organic solids	82·08
Nitrogen	13·1
Albumose corresponding to nitrogen	81·8
Organic remainder	0·28

On investigation, the albumose was found to be largely secondary in character, *i.e.* deutero-albumose, and therefore very nearly akin to pure peptones. The amount of somatose available did not permit of any practical dietetic experiments on it, but reference to Klemperer (*Berl. klin. Wchnschr.*, 28th June 1897), Bernstein (*ibid.*, 22nd Feb. 1897), and Salkowski (*Deutsche med. Wchnschr.*, Leipzig, 1897, No. 15), shows that the ingestion of somatose, to the exclusion of all other food, cannot be continued without bringing on diarrhœa; as an adjunct to other food, in teaspoonfuls three or four times a day, it not only acts as a food itself, but as a gastric stimulant and sedative at the same time, owing to its ready digestion and its combination with the acids in the stomach. The iron-somatose is a similar preparation, containing 2 per cent. of iron in organic combination, and is especially fitted for the treatment of anæmic and chlorotic cases, in doses of 80 grs. twice or 60 grs. thrice daily. There is no doubt that these preparations would be extremely beneficial, in small amounts, during convalescence from enteric fever, pneumonia, etc. They can be, with advantage, given dissolved in milk.

COLCHI-SAL CAPSULES.

SOME very elegant capsules, each containing ¼ mgrm. of colchicine, dissolved in 20 cgrms. of salicylate of methyl, have come from their maker, B. Kühn, London. The salicylate of methyl is prepared from *Betula lenta*, the amount employed being equal to 5 grs. of sodium salicylate. The capsules afford an excellent means for the administration of this alkaloidal salt, of which so much has been heard lately in the treatment of otherwise obstinate cases of gout.

MONTHLY NOTES
ON METEOROLOGY AND VITAL STATISTICS.

By A. LOCKHART GILLESPIE, M.D., F.R.S.E., F.R.C.P.Ed.,
MEMBER SCOTTISH METEOROLOGICAL SOCIETY.

METEOROLOGICAL MEANS FOR THE EAST OF SCOTLAND DISTRICT, FOR THE FIVE WEEKS ENDING APRIL 2, AND FOR THE YEAR FROM JANUARY 2.

	Temperature.			Rainfall in Inches.		Sunshine. Hours.		Mean Daily Variability of Temperature.
	Mean.	Accumulated Day-Degrees.		Actual.	Accumulated from Jan. 2.	Actual.	Accumulated from Jan. 2.	
		Above 42°.	Below 42°.					
Mean	38°·5	*[1] 69° [2] 133°	182° 531°	2·5	7·5	118	209	3°·0
Observed	39°·5	[1] 68° [2] 188°	158° 351°	1·7	4·9	136	245	3°·0
Difference	+1°	[1] − 1° [2] +55°	− 24° −180°	−0·8	−2·6	+18	+36	±0

VITAL STATISTICS.

MORTALITY IN FOUR LARGE TOWNS IN THE EAST OF SCOTLAND, DURING MARCH, AND SINCE JANUARY 1. Actual Numbers and Rate per 10,000 per annum.

	Total.		Constitutional Diseases.		Circulatory System.		Nervous System.		Respiratory System.	
	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.
Deaths expected and Mean Rate for 1891–1896	[1] 1263 [2] 3701	224 218·7	229 644	40·6 37·9	115 331	20·4 19·5	143 403	25·3 23·7	294 874	52·2 51·5
Actual Deaths and Rate per 10,000	[1] 1250 [2] 3286	221·6 193·8	285 725	50·5 42·6	138 325	22·6 19·1	138 382	24·4 22·5	265 675	46·6 39·8
Difference from Mean	[1] − 13 [2] − 415	−2·4 −24·0	+56 +81	+9·9 +4·7	+13 − 6	+2·2 −0·4	− 5 −21	−0·9 −1·2	−29 −199	− 5·6 −11·7

	Digestive System.		Urinary System.		Pneumonia.		Phthisis.		Cancer.	
	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.
Deaths expected and Mean Rate for 1891–1896	[1] 67 [2] 204	11·9 12·0	31 86	5·5 5·07	104 292	18·4 17·2	128 336	22·6 19·8	44 138	7·9 8·1
Actual Deaths and Rate per 10,000	[1] 82 [2] 241	14·7 14·2	25 75	4·2 4·42	98 274	17·2 16·1	125 332	22·1 19·6	69 178	12·2 10·5
Difference from Mean	+15 +37	+2·8 +2·2	− 6 −11	−1·1 −0·65	− 6 −18	−1·2 −1·1	−3 −4	−0·5 −0·2	+25 +40	+4·3 +2·4

* NOTE.—The figure [1] denotes the data for March, [2] for year to date.

The mean temperature for March in the East of Scotland district was a little above the average, the accumulated day-degrees above 42° F. a little below, those below 42° much smaller in number than, the normal. The rainfall was only 68 per cent. of the normal mean, the hours of bright sunshine more numerous than usual, and the variability of temperature equal to it. From 2nd January, the day-degrees above 42° exceed the mean by 55° or 41 per cent.; those below 42° as many as 180° below it, or the numbers registered form only 66 per cent. of the normal figure. A very similar deficiency occurs in the rainfall values, the precipitation for the year only amounting to 66 per cent. of the mean. The first quarter of the year has been rather more favoured with bright sunshine than usual.

The last three weeks of the five under review were marked by cyclonic barometric conditions with an unusual distribution, the barometer being much higher in the west and south than in the east and north, than the average. The first and last weeks of March were cold, the others warm.

The diminution in the death-rate noted for January and February was only slightly apparent in March, the deaths being thirteen fewer than the average. The decrease was most marked, 10 per cent. under respiratory diseases; while deaths from constitutional, circulatory, and digestive diseases and from cancer show a considerable excess. Influenza caused directly forty-four deaths, twenty-nine of these in Edinburgh, or 5 per cent. of the total deaths in that city.

From the beginning of the year to 21st March the deaths have been fewer than the average by as many as 415, or 11·2 per cent. of the total deaths expected. This has been largely due to the decrease in the number of persons dying from diseases of the respiratory organs, 22 per cent. below the average, and to a less degree from diseases of the nervous and urinary systems. Deaths from constitutional and digestive diseases show a considerable increase, while deaths from cancer are almost 29 per cent. above the average.

These variations in the death-rate have accompanied warm, dry, sunny weather, which, however, has been attended by a stronger wind-pressure than usual, and been broken temporarily by short periods of moderate cold. The unusual prevalence of diseases of the digestive organs, noted last month, has persisted, the excess of deaths over the numbers expected amounting in March to 22·3 per cent., and from 1st January to 18·1 per cent., and this excess has occurred in warm, dry weather.

March, therefore, with a slight excess of warmth, diminished humidity and rainfall, increased wind pressure and sunshine, and a normal variability of temperature from day to day, was characterised by very much the same feature as the month of February showed; fewer deaths from lung disease, and a greater number from constitutional, cancerous, and digestive maladies. The year to date marked by the same meteorological phenomena is characterised by exactly the same features.

EDINBURGH
MEDICAL JOURNAL.

ORIGINAL COMMUNICATIONS.

A FIT OF GOUT (PAROXYSMUS PODAGRÆ): A STUDY IN PATHOLOGY.[1]

By George W. Balfour, M.D., LL.D. Edin. and St. And.

> "Non fingendum, aut excogitandum, sed inveniendum quid Natura faciat, aut ferat."—Bacon.

Gout as a disease has been known to physicians from time immemorial, yet its most graphic description is of no earlier date than Sydenham, who, in memorable words, has depicted it with all the skill of a physician and all the accuracy of a sufferer. Succeeding writers have but copied Sydenham's delineation of the disease, and have modified his theory of its rationale. This, as we know, was a reversion from the doctrine prevalent in his day, of tartar accumulated in the blood and deposited as chalk stones in the joints, to the still older theory of an effort of the system to expel a peccant humour, the result of imperfect coction. To Cullen's logical mind we owe the differentiation of gout into its several varieties of regular, atonic, and aberrant. And to Cullen also is due the statement that the supposition of any morbific matter is unsupported by any evidence, is quite superfluous, and is useless, "as it has not suggested any successful method of cure."[2] Cullen's own idea was that gout "is manifestly an affection of the nervous system."[3] Modern advances in zoo-chemistry and in morbid anatomy have introduced various modifications of our ideas as to the ultimate pathology of gout. Some of these modifications are more closely allied to the humoralism (Haig, etc.), and others to the solidism (Ord, Bristowe, etc.) of our forefathers; while even those who with Cullen regard the nervous system as the *primum mobile* of this disease (Duckworth, etc.) are forced to recognise the exciting influence of a pre-existing toxæmia.

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[1] Read before the Edinburgh Medico-Chirurgical Society, 4th May 1898.

[2] "First Lines," ccccxcii. p. 375.

[3] *Ibid.*, ccccxciv. p. 381.

With all our increased accuracy in details, it does not appear that our ideas of what gout really is are any clearer or any better defined than those of our forefathers. To the non-professional mind gout presents itself in two aspects—first, as an embodiment of ill-temper, an agonising toe, somebody's specific, and short commons; and, second, as a meaningless epithet, vaguely applied by physicians to all ailments occurring after middle life which are obscure in their origin, variable in their symptoms, and not readily amenable to treatment. As to the professional idea of gout I speak with all humility, having been unable with any certainty to discover what is the prevalent professional conception of this disease; but I presume, subject to correction, that the clearest heads among us regard it as a toxæmia with a uric acid basis, the nervous system as a ruling spirit, and the whole organism as a *campus martius* wherein to exercise. What idea our younger brethren entertain of gout it would probably be hard to imagine, but it must seem to them as a most mysterious complication of life, when they are taught that not only may it hop like a bird from one part of the body to another, but also that such very tangible affections as "hæmatemesis and hæmoptysis are often cured by a regular fit of the disease" (Gairdner). A former member of this society, Dr. Craigie, in his "Practice of Physic" has said that it is in the natural history of gout that its real character and nature is to be sought; and this idea has been repeated and emphasised by the late Dr. Todd in his "Croonian Lectures." This view I myself homologate, and I am persuaded that a clear idea of the true nature of a paroxysm holds the clue to much that seems mysterious in the history of gout, and puts into our hands the means of preventing, if it cannot always enable us with any certainty to cure, its manifestations. The natural history of a paroxysm may not explain all the mysteries of gout, but it gives us a clue that will suffice to guide us through the labyrinth of symptoms presented by this protean malady.

I cannot, I regret to say, show you an illustration of a gouty toe in its paroxysmal condition. So far as I know, no such delineation exists; and he would be a bold artist indeed who should propose to sketch such a toe from nature. A mere fancy sketch would be of no value for my purpose, so I must ask you to recall the simulacrum of such a toe if you have ever seen one; and if you have not, you may still, I hope, be able intelligently to follow me as I point out and endeavour to explain the rationale of the several signs described by Sydenham and others.

Podagra, you may remember, is the name given by Cullen to the twenty-third genus of the order Phlegmasiæ, class Pyrexia. Cullen adopted the name Podagra from Boerhaave and the older writers, because it correctly, if somewhat vaguely, described the great characteristic of the disease (a foot seizure) without committing him to any definite theory of its nature, explicitly rejecting the term Arthritis as misleading, and as conveying an idea (of inflammation) for which there is absolutely no foundation. Podagra is distinctly a febrile (pyrexial) disease; it has also all the characteristics of a phlegmasia, but of the three characteristics by which an external inflammation is recognised—*calor*, *rubor*, *et tensio dolens*, the first is conspicuous by its absence. Moreover, podagra invariably terminates by resolution, and never ends as inflammations so often do, either in suppuration or in gangrene.

Sydenham tells us that on the morning after the commencement of an attack, the part affected—the metatarso-phalangeal joint of the great toe—is found to be swollen, but that up till this time "the only visible swelling had been that of the veins of the affected joint."[1] Turgidity of the veins coming from the affected joint is thus the earliest visible sign of an attack of gout, and this sign persists till convalescence sets in. But venous turgescence is not an accompaniment of inflammation. The veins of an inflamed part undoubtedly carry a larger amount of blood than in health, because the dilated arteries of an inflamed part convey to it a larger amount of blood than usual, and this has to be returned by the veins, but these vessels remain inconspicuous and unnoted amid the general turgidity of the part. In the case of a paronychia, for example, which is an inflammatory affection of the distal extremity of a digit, and in situation, at least, closely resembles a fit of gout, there is redness, heat, and painful swelling, but the veins are neither turgid nor visible. The dilated arteries carry an excess of blood to the part, but the blood path is everywhere free, and the blood is speedily restored through the veins to the general circulation. Should, however, the blood path be choked by an embolus or a thrombus, the case is altogether different. When such a block occurs, in a vessel with many collateral communications, the circulation is scarcely checked and is speedily restored to its normal. But should the block occur in a terminal artery, an anæmic area is at once formed in front of and around the obstruction. When the circulation around this area is carried on through capillaries and small arterioles, no true infarction is formed; but from the sluggish movement of the blood within the anæmic area a stasis occurs in the vessels, which, if visible at all, is most evident in the veins leading from the part up as far as a more or less distant point where they enter a sphere in which normal conditions prevail. Within the anæmic area the augmented tension and diminished vitality of the walls of the vessels, due to the sluggish flow of the blood, cause an accumulation of plasma in the part, accompanied by a diapedesis of the corpuscular elements. Hence there is swelling of this area; and as the red corpuscles part with their colouring matter to the plasma the swelling is of a dusky redness, which gradually deepens till the normal conditions are restored.[1]

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[1] *Syd. Soc. Translation*, p. 125.

Now, if we turn to a gouty paroxysm, and limit our consideration to its essential characteristics, we find that it commences with a sudden attack of agonising pain in the part affected—the metatarso-phalangeal joint of the great toe. But pain is not an exalted condition of nerve function. As Anstie has said, pain is the prayer of the nerve for more blood, for better nourishment. Whatever interferes suddenly and more or less completely with nerve metabolism gives rise to intense pain. Hence the excruciating agony that follows the occlusion of a vessel, whether artificially, as in the treatment of aneurysm by compression; or naturally, as in gangrene following blocking of an artery by embolism or thrombosis, or in many other similar processes. In a gouty paroxysm the excruciating agony comes on suddenly, and is perfectly explicable, on the theory of thrombosis of the small vessels of the joint affected. Moreover, the sequential phenomena are precisely those that would follow the formation of an anæmic area in and around the joint implicated. First of all, before there is much if any manifestation of local swelling,[2] there is visible turgidity of the veins leading from the affected joint up to the dorsum of the foot, till they merge into a sphere where normal conditions prevail. Next, we have swelling in and around the joint, from accumulation of plasma within the anæmic area. And, lastly, this swelling becomes increasingly tense, stretching the skin and giving it a glistening appearance, which is perhaps all the more striking from the deepening dusky redness due to the solution of the colouring matter of the red corpuscles of the plasma.

All the events of a gouty paroxysm are thus readily explicable on the theory of thrombosis of the small vessels of the joint affected, and upon no other theory with which I am acquainted; and all the concomitant phenomena are corroborative of this view.

For example, a gouty paroxysm is commonly ushered in with a rigor followed by a rise of temperature, phenomena of daily occurrence in connection with embolism—with sudden blocking of the circulation. The affected joint presents, we know, many of the indications of inflammation, the *rubor* and the *tensio dolens* are very much in evidence, but the *calor* is conspicuously absent. I have occasionally taken the temperature of the distal extremity of a gouty toe, and found it to be invariably subnormal. Sir Dyce Duckworth[3] tells us the same story. He says he has repeatedly taken the temperature of a gouty toe by putting a thermometer close to it and keeping the two in contact for twenty minutes with a roll of cotton wool,[1] and has always found it subnormal. On two occasions it was 97° and 95°·5, the corresponding temperatures in the mouth being 100° and 100°·4. I am aware that the temperature of the corresponding toe on the opposite foot has also been found subnormal, but, however we may explain this,[2] it does not lessen the remarkable fact of the distal part of the affected toe, which is tumid, red, and painful, and to the sufferer feels hot, having a temperature two or three degrees below that of the body generally; a state of matters which seems wholly inexplicable on any other theory than that of a stasis of the circulation at the part affected.

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[1] *Vide* paper by Dr. M. Litten in the *Ztschr. f. klin. Med.*, Berlin, Bd. i. S. 189; and Cohnheim's "Lectures on Pathology," *New Syd. Soc. Translation*, vol. i. p. 121.

[2] Sydenham, *op. cit.*, p. 125.

[3] "A Treatise on Gout," p. 248. The bodily temperature in gout is seldom over 102°, but has been known to rise to 104°.

After a fit of gout the tissues about the joint and its cartilages are found to be infiltrated with urate of soda, a condition trifling after a first attack, but which increases with each succeeding paroxysm. This condition Garrod regards as of the highest importance as indicating a specific form of inflammation,[3] a form of inflammation which would indeed be not only specific but peculiar and altogether *sui generis.* On the other hand, we know from the researches of Garrod himself that in gout the blood serum contains uric acid,[4] and that this is also found in the serous fluid within the pericardium, the peritoneum, and the subarachnoid space of gouty subjects.[5] The concretions of urate of soda upon the auricular cartilages and on other parts, and the nodosities about the digital joints, known as gouty pearls and Heberden's knobs, are not preceded by any inflammation, but probably follow some slight local injury. At first—if we see them early enough, which is rarely the case—we find a small localised and, as it were, encysted effusion, within which the urate of soda slowly crystallises, the remaining serum is absorbed, and the pearl or knob is left behind. The so-called pearls rarely grow, generally indeed become harder and smaller; but the knobs, by a repetition of the process, do grow, and more and more disfigure the extremities.

Urate of soda is a somewhat insoluble salt, always present in the blood serum of gouty patients; and when the plasma accumulates within the anæmic area of a gouty toe, the salt slowly crystallises out of the extravascular fluid, and gets left behind, infiltrating the cartilages, the cavity of the joint, and the tissues surrounding it, when the serous part of the effusion gets reabsorbed, as the circulation returns to its normal. Each returning paroxysm increases the amount of these extravascular urates, and also the disfigurement of the joint; but their deposit is not the result of any inflammatory action, nor is their presence in the joint ever the cause of any inflammation, beyond the disfigurement; their presence in and around the joint seems to give rise to no disturbance and to be absolutely neutral, so far as the state of the person so disfigured is concerned.

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[1] This method of taking the temperature makes it absolutely certain that it was subnormal, as by covering the bulb of a thermometer with cotton wool we may so prevent the dissipation and favour the accumulation of heat as apparently to raise the perfectly normal temperature of either the mouth or the axilla up to 108° or even higher.

[2] The low temperature of the opposite foot may be due to reflex contraction of its arteries from the intense pain of the podagra. Just as Brown-Séquard and Tholozan found that pinching raised the temperature of the limb pinched but lowered that of the opposite one.—*Gaz. méd. de Paris*, 1870, p. 142.

[3] "Gout," third edition, p. 187.

[4] *Ibid.*, p. 84.

[5] *Ibid.*, p. 109.

There is nothing, therefore, in the history of a gouty paroxysm which connects it with any form of inflammation, and all the phenomena present are readily—and seemingly only—explicable on the theory of thrombosis of the small vessels of the joint affected, and the formation of an anæmic area around their sphere.

Nay more, the mode of prophylaxis, which has commended itself to many sufferers as a certain preservative from all the ills of an acute attack, as well as one method of cure which, in the hands of a bold practitioner, has proved eminently successful, are not to be explained, so far as I can see, upon any other theory whatever.

Cullen narrates some curious instances of the sudden cure of gout. One man, long confined to bed with gout, when his neighbour's house took fire, ran off as fast as he could. The provoked antagonist of another patient, dressed up as a spectre, and throwing the sufferer over his shoulder, dragged him downstairs, bumping his poor feet against every step; at the bottom of the stair the ill-used man found his legs, and ran upstairs fast enough. While a third, on the first premonition of an attack, took his dog and his gun, and walked it off.[1] Sir William Temple tells us of the Rhyngrave, who was killed before Maestricht in 1676, and was a friend of his own; on the first indication of a paroxysm this nobleman went out immediately, whatever the weather, and walked as long as he was able, "pressing most upon the foot that threatened him; when he came home, he went to a warm bed, and was rubbed very well, and chiefly upon the place where the pain began." If the attack continued or returned next day, the same course was pursued, so that he was never laid up with gout; and he thought so well of his treatment that he strongly recommended it to his son, should he ever be attacked in the same manner. Temple also tells us of one of his brother's gamekeepers very subject to gout, but who never laid himself up. When attacked he busied himself with his deer or his stud, walking about from morning to night in spite of the pain.[2] And the late Dr. William Gairdner of London was acquainted with an active, lively old gentleman of 85, who, when seized with gout, always replied to the remonstrances of his family and his physicians, "I'll walk it off," quaintly adding "Go to bed with the gout, and it will surely go to bed with you, and be mighty bad company."[3] A remark that recalls the statement by Sir William Temple, that gout haunts chiefly those who treat it as a friend, and not as an enemy, who "carry it to bed with them, and keep it soft and warm, and indeed lay up the gout for two or three months, while they give out that the gout lays up them."[1]

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[1] "First Lines," 2nd edition, 1778-84, MS. notes, p. 389, etc.

[2] "The Works of Sir William Temple, Bart.," Edinburgh, 1754, vol. ii. p. 127.

[3] Gairdner, "On Gout," London, 1849, p. 114.

These are sufficiently remarkable statements, based upon equally remarkable facts, yet we are told that the idea of attempting to abort a fit of gout could not occur to anyone "who regards it from a proper pathological standpoint."[2] To myself it seems quite the other way about, and that it is only to those who have a correct idea of the pathology of gout that it could legitimately occur to attempt to abort an attack. We are told that "the risks of suppression of local symptoms are so great, and the benefit, if there be any, so dearly bought in most cases, that an ectrotic treatment can seldom be advisable."[3] But we never hear of any evil results following the successful aborting of a fit by active exercise; Dr. Gairdner's old friend carried it out to the end of his life. A friend of Mr. Apperley (the Nimrod of old times), after a skinful of wine and other good things, always finished the evening by walking off the soles of his pumps before retiring to bed, in order to ward off gout, and this he did successfully and without damage to the end of his days. Cullen, it is true, tells us of one man who, after warding off many attacks, was suddenly laid on his back by a severe fit,[4] but his failure to check this one could scarcely be attributed to his having successfully overcome previous attacks. Both Cullen and Duckworth, regarding gout as largely an affection of the nervous system, look upon the good results that follow this method of fighting off a fit as an example of the curative effect of "great mental emotion,"[5] or as an instance of the "remarkable influence exerted by a vigorous nervous system on the peculiar phenomena of a gouty fit."[6] But no mental emotion, however great, nor any power of will, exerted even by the most vigorous nervous system, can produce any effect upon a gouty digit, unless it be accompanied by movements of the joint sufficiently energetic to dislodge any thrombi, break up the stasis, and restore the circulation in and around the joint affected. On the other hand, we know that manipulation and friction, carried out with or without the will of the patient, are sufficient to restore the circulation and to cut short an attack without any ulterior bad result. It is true we hear but little of this method of treatment in medical literature, yet it must have been occasionally employed, as when Boerhaave, in his 1275th aphorism, under section 8, speaks of curing gout "*exercitio magno, continuato, equitationis in aere puro, tum frictionibus, motibusque partium saepe iteratis,*"[7] the con-text shows that he speaks of these as approved methods to employ in the cure of an acute attack, and not merely as means to be used for the removal of the rigidity of gouty limbs during intervals of comparative health.

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[1] Temple, *op. cit.*, p. 128.

[2] Duckworth, *op. cit.*, p. 348.

[3] Duckworth, *loc. cit.*

[4] *Op. cit.* p. 392, MS. note.

[5] Cullen, *op. cit.*, p. 389.

[6] Duckworth, *op. cit.*, p. 349.

[7] Boerhaave, "Aphorismi de cognoscendis et curandis morbis," Lugd., Batavorum, 1727, p. 212.

It may be readily understood that, however efficient this method of treatment may have proved itself to be, it is not likely to have been often or lightly resorted to. When the trifling succussion caused by merely crossing the floor to the bedside is liable to provoke intolerable agony, he must be a bold practitioner who would venture to propose to apply massage to the offending digit itself. Yet this has not only been proposed, but also successfully carried out with the most astonishing results.

In the first half of this century we had in Edinburgh a well-known practitioner—Dr. William Balfour[1]—who had a great reputation for his successful treatment of rheumatic affections, by the various methods we now comprise under the term massage. Occasionally he attacked more acute ailments with a boldness and a success which were truly remarkable. In the *Edinburgh Medical and Surgical Journal* for October 1816,[2] Dr. Balfour relates several cases of acute gout, treated by compression, friction, and percussion. These cases are all remarkable, and all perfectly successful. I shall quote only one, as that is sufficient to show his method and its results:—

CASE.—Mr. J. O., solicitor, æt. 47, of a cholerico-sanguine temperament and full habit of body, woke in the morning of 22nd July with violent pain in the balls of both great toes, particularly at the flexures of the joints. "When I visited him at eleven o'clock forenoon, the parts were swelled, red, tense, and shining. The inflammation and pain were confined almost exclusively to the balls of the great toes, except that in the left, which was by much the worst, the pain reached upwards about half-way along the metatarsal bone. The patient experienced continual excruciating pain, even when at perfect rest; his countenance indicated considerable distress, and he complained of sickness, general uneasiness, and oppression; pulse, 82.

"When I entered my patient's room, he told me that, if I intended to apply friction to the parts affected, he was afraid he could not suffer it; for he had attempted that himself, but might as well have applied 'living fire.' I told him I knew that friction was quite inapplicable to his case as it then stood, but that I would, notwithstanding, employ mechanical means for moderating the paroxysm, and I hoped with complete success. I therefore grasped the ball of the toe in my hand, applying pressure gradually, to a very considerable degree. Slight pressure gave pain; heavy pressure none. In this manner I compressed the parts, sometimes with one hand, at other times betwixt both hands, for about ten minutes, now and then interposing gentle percussion; and then applied a thin flannel bandage. Ordered a brisk purgative of senna and sulphate of magnesia."

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[1] William Balfour was the younger son of Alexander Balfour of Tillery, Kinross-shire, where he was born in 1769. He graduated at the University of Edinburgh in 1814, and shortly afterwards, as is stated in an obituary notice in the *Lancet* of 9th May 1846, he "commenced a career which, under whatever aspect it is viewed, has seldom been exampled in the medical world." His paper entitled "Observations on Adhesion, with Two Cases demonstrative of the Powers of Nature to restore parts which have been by Accident totally separated from the Animal System," was both original and acute, and characterised by perspicuous and forcible language, qualities by which his style was uniformly distinguished. This paper was transferred to every scientific periodical of repute, and at once made him famous. He subsequently turned his attention to the treatment of rheumatism and gout, and speedily acquired a large and lucrative practice. He died in 1846 at the age of 77.

[2] P. 432, "Observations, with Cases, illustrative of a New, Simple, and Expeditious Mode of Curing Gout."

In the evening the patient said he "had considerably less pain, or rather none at all, from the moment I left him; but he had a good deal of cold shivering during the day;" his pulse was 100. The swelling and redness of the parts had much abated, and motion of the affected joints was practicable. Compression and percussion were reapplied, and were much better borne than in the earlier part of the day. Next morning the patient was found to have slept all night without interruption; his pulse was 80; pain, swelling, and redness of the parts almost entirely gone, and he could suffer them to be handled with the utmost freedom; he walks very well. Compression and percussion were applied in the morning, in the evening, and again next morning, after which the patient went abroad in the prosecution of his business—on the third day of his attack.

Such a case—even if it were a solitary one—would be truly remarkable, but as one of a series it is more than remarkable, it is instructive. The case and its cure are so graphically detailed as to leave no doubt as to the nature of the one or the reality of the other. Dr. Balfour points out that, as the roll of the waves does not at once cease when the gale drops, so also the assuaging of the local ill was not at once followed by the cessation of the symptomatic fever, which indeed increased for the first few hours, but speedily thereafter passed away. The general oppression, the sickness, and the dyspeptic symptoms were also relieved, though this, as the doctor wisely remarks, was no doubt largely due to the purgative remedies employed, and not altogether to the cure of the joint affection; the latter he rightly ascribes to the restoration of the circulation in the part affected.

As we have seen that all the phenomena—objective as well as subjective—of a gouty paroxysm are apparently only explicable on the theory of thrombosis of the small vessels of the part affected, so now we find that a gouty paroxysm can be readily and rapidly cured by measures which can only act by restoring the circulation through the part affected, and which are well calculated to affect this result. But, however delightful it must be to be cured of a bad fit of gout by one or two séances of a practised masseur, I fear there would be a difficulty in getting any one to submit to an operation which seems to bring with it the possibility of such agony. And I am equally persuaded that there are few, if any, who possess sufficient nerve and skill to carry out effectively so delicate an operation.

On a future occasion I hope to return to the subject, to point out the rôle of thrombosis in relation to all those various affections we term gouty, to endeavour to expiscate the causes of thrombosis in gouty subjects, and to show how they may best be warded off; at present I must content myself with having directed your attention to what seems to be the true cause of a gouty paroxysm, which, as Craigie and Todd have told us, is the first step to a clear understanding of the true nature of gout itself. And I cannot conclude better than in the words of Sir William Temple, who quotes from a Dutch friend who had long lived in the East Indies, that there "the general remedy of all that were subject to the gout was rubbing with hands; and that whosoever had slaves enough to do that constantly every day, and relieve one another by turns, till the motion raised a violent heat about the joints where it was chiefly used, was never troubled much, or laid up by that disease."[1] I can so far corroborate this that the few cases I have persuaded to employ massage of the extremities night and morning, have since then kept free from any severe attack.

IS THE WORK OF THE NEURONE OF AN ELECTRICAL NATURE?

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THE term "Neurône," which was introduced by Waldeyer (¹) in 1891, has, through its pregnancy and simplicity, rapidly gained civic rights in anatomy and physiology as well as in clinical medicine. The ever-fresh veteran Kölliker (²), who resumed his researches with renewed zest, as soon as the introduction of Golgi's method and its perfection by Ramón y Cajal had opened up a new vista of the finer anatomy of the nervous system, does not like the term "neurone," and has proposed in its place the words "neurodendron" or "neurodendridion." Yet these latter terms, although perhaps more descriptive and significant than "neurone," have remained still-born, no doubt because they are too long and cumbersome.

The neurone, then, consists of three parts, namely, the nerve-cell, the axone, and its collaterals, and the protoplasmic processes, or dendrites. The cell with its dendrites is assumed to be the perceptive and impulsive element, in which the nervous force is generated; while the axone with its collaterals plays the part of the conductor, by which the force is transmitted either to other cells, or the terminations of sensory spheres, or to contractile elements.

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[1] *Op. cit.*, vol. ii. p. 127.

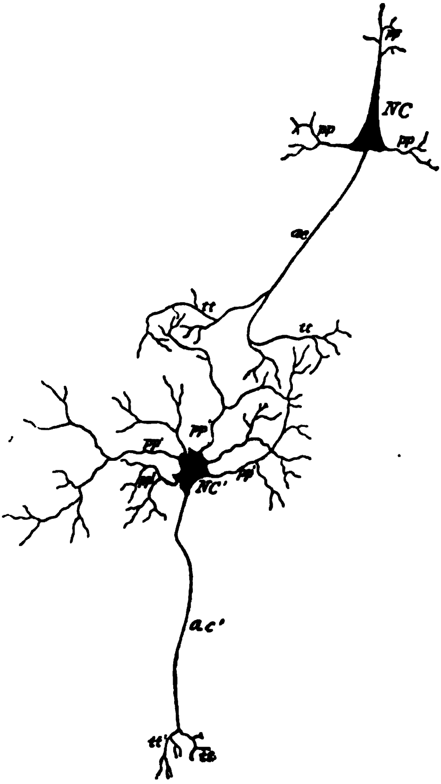

FIG. 1.—The neurone. Pyramidal cells from the cortex (*NC*, *NC'*), from which proceeds a single axone (*ac*, *ac'*), dissolving into "collaterals" or "terminal trees" (*tt*, *tt'*), and numerous "dendrites" or "protoplasmic processes" (*pp*, *pp'*).

The nerve-cell has a far more complicated structure than was formerly believed. Nissl (³), to whom we owe the most important researches on this difficult subject, has distinguished eight separate types, which differ in organisation, and represent different cellular functions. "Nissl bodies" are certain stainable parts in the protoplasma of the cell—its chromophile substance—which assume the form of clods, flakes, or spindles, and are commonly, although somewhat incorrectly, called *granula*. When stained with methylene blue, they give to the body of the cell a mottled appearance, like that of a tiger's skin. It is generally acknowledged that, of all the different parts of the neurone, the *nucleus of the cell* is the most important; for the nucleus has a paramount influence upon the formation, metabolism, growth, and multiplication of the cell;

and in unicellular organisms on its very existence. The nucleus also contains differentiated substances, namely, a stainable external layer, or wall; a relatively scanty framework; and accumulations of framework matter, in which there are generally one or several nucleoli, contained in an apparently homogeneous nuclear juice.

If a nerve-cell be poisoned or injured, or separated from its axone, striking and typical changes can be shown to occur in the cell within twenty-four hours, namely, a swelling of the cell-body, and granular disintegration of the chromophile substance, which loses its sharp outline and its property of becoming stained; and certain further changes occur in it later on, which can be predicted with certainty. On the other hand, faradisation of the cell will enable it to receive more colouring matter than before; and cells which have appeared pale have, under the influence of the faradic current, shown to become deeply stained. Injury to the cell may be recovered from as long as its nucleus remains intact. Nerve-cells are, from the very beginning and throughout the further course of their lives, distinct and independent individuals, which have no other communication with each other than by contact, and do not anastomose.

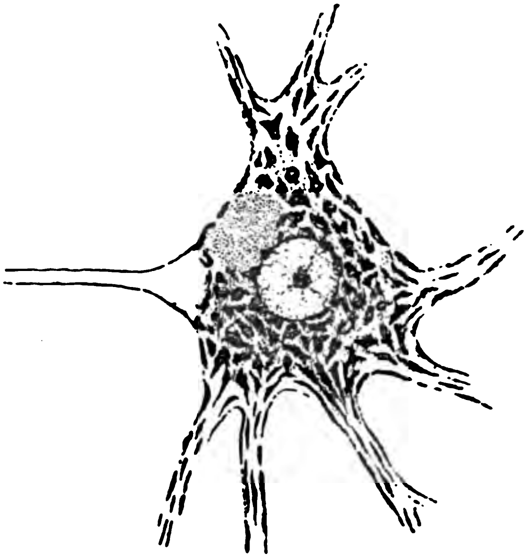

FIG. 2.—Large motor nerve-cell from the anterior cornu of the cord, showing nucleus with its nucleolus, "Nissl bodies" in the protoplasma or body of the cell, a number of dendrites, and a single axone.

According to function, recent research seems to have established the fact that there are three different types of cells, namely, first, the motor cell in the anterior cornua of the spinal cord, the motor nuclei of the bulb, and Purkinje's cells in the cerebellum; second, the sensory cells in the ganglia of the cranial and spinal nerves, the olfactory cells of the Schneiderian membrane, certain retinal cells, and cells of the terminal sensory nuclei in the cord and brain; and, third, the pyramidal cells of the cortex, to which the intellectual phenomena appear to be bound. The predominance of one or the other set of these cells appears to be connected with the scale of animals, as far as intellectual, sensory, and motor functions are concerned; and this would likewise apply to different individuals of the same species. Thus we know that animals which have a very large size, and therefore a bulky brain, are not for that reason always the most intelligent of their kind, as the grey matter may in them be chiefly composed of psychomotor cells, and such as receive sentient and sensory currents, while only a comparatively small space of the cortex may be left for the association cells, which form the anatomical base of the intellectual activities of the brain. In the same way, one human brain may be of equal size and bulk with another, and yet the intellect of the two persons concerned may be very different.

From these considerations it naturally follows that the *mere weight* of the brain, upon which so much stress was formerly laid, and also the intracranial capacity, which Sir William Turner (4) has recently discussed, are not of such transcendent importance as was at one time imagined. The average weight of the male European brain is from 1300 to 1450 grms., and that of the female brain somewhat less. It has, however, often happened that unusually heavy brains have been found in persons who had been very insignificant during life, while in highly intellectual men the weight of the brain was somewhat under the average. A great painter, or sculptor, or musician, or scientist, or lawyer, or doctor, may have certain territories in his cortex highly developed, without a correspondingly large amount of nerve-matter in other areas. His entire brain may therefore possibly weigh less than that of a butcher or prize-fighter, whose psychomotor area may be exceedingly heavy. Gambetta's brain, which showed an amazing development of Broca's convolution, was altogether lighter than that of other persons whose names have never been heard of in history.

With regard to this point, Perls has made the interesting observation that in a considerable number of great men a hydrocephalus would appear to have existed in infancy, and to have disappeared later in life. He concluded from this that in a skull which had become dilated, the eventual growth of the brain would meet with less resistance than in an ordinary healthy skull. It is well known that Cuvier and Rubinstein had in infancy suffered from hydrocephalus, and the brains of both of these great men were found after death to be unusually heavy. A moderate degree of hydrocephalus in infancy would therefore appear to be a rather desirable possession.

1. THE AXONE.—The second constituent of the neurone is the axis-cylinder, or principal nerve-fibre, or nervous process, or neurite, or neuraxone, or axone. This may be motor, sentient, sensory, or sympathetic, and constitutes almost invariably a single long nerve-fibre which proceeds from the cell, and, after passing on for some distance, terminates in a network of very fine branches, or terminal trees, or collaterals (Fig. 1). The axone looks like a thread of black cotton on a white ground, and differs in width and length, according to the longer or shorter course it has to pursue.

The differentiation of the axone increases proportionately to the higher position of the animal in the ascending scale of creation, being plainly perceptible in a primordial form in the invertebrates, and more developed in the fishes and reptiles, while a full network is only seen in the highest vertebrates. It appears to be a soft but solid formation, consisting of fibres and a homogeneous intermediate substance, which Kölliker has termed *neuroplasma*, and Waldeyer *axoplasma*. Leydig and Nansen consider that the axone exists in a liquid condition.

While Golgi (5) and his pupils consider that there is a kind of general fine nervous network in all the different layers of the grey matter, which receives the expansions of the nerve-cells and sends forth sensory nerve-fibres, His (6) was the first to lay stress upon the independence of the central nerve-cells from each other, and the free termination of sensory fibres in the white matter, which he had observed in his researches on the development of the fœtus. It was, however, Ramón y Cajal (6A) who succeeded in showing that this also obtains in the nervous centres of completely developed animals. It appears, then, that whereas Golgi had supposed the existence of a network, the terminations of the axones are in reality free. There is no network, but a dense conglomeration, the numerous constituents of which are abundantly crossed and interlaced, but nevertheless entirely independent of each other, and never anastomose. This conglomerate has been termed *neuropilema* by His, and may be compared to a primeval forest, the impenetrable thicket of which consists of densely intertwined, yet essentially separate individual trees and branches. Thus the connection of nervous elements is entirely one of intimate contact, which is as efficient in a physiological sense as actual continuity of matter would be. The termination of the nerve is marked by a special thickening or clump, the *cône d'accroissement* of Cajal; and wherever a fibre is seen to end with such a clump, this may be taken as its definite termination. Intimate contact rather than actual continuity has long been known to be the mode of action of the terminations of the motor nerves in the muscles. Lenhossék (7) has laid stress upon the point that the new theory, according to which the path of conduction is everywhere formed by a number of neurones, which, like the links of a chain, only join one another by free contact, and are yet independent in a certain sense, renders all our ideas of the actual way in which the work of the nervous system is accomplished much more simple and easily intelligible. Waves of energy do not pass in continuity, but cease in their original form at the terminal trees of the first neurone, whence they proceed to act by induction, leading to a certain change in the second neurone, which is in contact with the first, yet without the action being identical. Each unit or neurone is therefore able to alter the nerve current in a way peculiar to itself, by induction; and this appears to correspond much better to the complex character of nervous work than to assume an uninterrupted path, carrying an impression unchanged all the way from beginning to end.

How is the nutrition of the axone effected? It appears to be carried on in a twofold way, namely, partly from the neighbourhood, and partly from a distance. The fibre certainly possesses, at a certain stage of development, numbers of blood vessels, from which nutritive material must be drawn for the axone, and thrombosis or embolism of which are known to injure the function of the nerve-fibre. The principal trophic influence, however, is given to it by the nerve-cell from which it starts. Waller(8), sen., showed many years ago that when the axone had been separated from its cell, degeneration takes place in the former, which begins at the place of injury, and eventually causes the whole of the separated fibre to perish (descending or cellulifugal degeneration), and that whether the fibre be afferent or efferent. Connection with the nerve-cell is therefore indispensable for the integrity of the axone (*Waller's law*). Goldscheider(9) has recently started the theory that there is a real transport of some substance into the axone and its most distant parts from the cell itself, and that this substance, which he assumes to be a ferment, enables the fibre to assimilate the nutritive material which is absorbed by it from the neighbouring blood vessels.

The trophic action of the nerve-cells on the axone does not appear to be exerted quite equally in all parts of the latter, but diminishes as the distance from the cell increases. Strümpell (10) has drawn attention to the fact that in toxic paralyses, such as arise from poisoning by lead, alcohol, the organic toxins, etc., peripheral neuritis is apt to appear in the parts which are at the greatest distance from the nutritive centre, that is, the anterior cornua of the cord; and that these cells themselves only appear to suffer in extreme cases. Again, in degeneration of the crossed pyramidal strands, owing to affection of the pyramidal cells of the cortex, the morbid process begins at the lowest portion of the cord, and thence progresses further upwards, but is arrested in the bulb.

Conversely, the integrity of the cell itself is likewise dependent upon a normal condition of the axone, injury to which will damage the cell. Marinesco (11) has shown that in persons whose limbs have been amputated, the large cells of the anterior cornua corresponding to the removed parts, begin to waste after a time, and eventually perish altogether. This degeneration may also affect the anterior roots and posterior columns, and peripheral injury of the motor nerves may thus lead to ascending degeneration of the central parts. This phenomenon occurs in direct contradiction to Waller's law, and probably escaped Waller's attention, because at his time the methods of examining the nervous structures were still in their infancy. With our present more refined modes of investigation, Nissl (³) was enabled to ascertain that even a few days after division of the portio dura, its nuclear cells in the bulb will begin to degenerate, while the nucleus shows a tendency to approach the periphery of the cell too closely. The further course of things appears to depend upon the circumstance whether the peripheral end recovers or remains damaged. In the former case, which occurs habitually when only a small portion of the nerve has been excised, the central cells will likewise recover; while, when a large piece of a nerve has been removed, and the axone is therefore permanently destroyed, the central cells will waste away altogether. A singular fact is, that the central end of the nerve is also found to waste under these circumstances, but much more slowly than the peripheral one; and this is no doubt owing to the slowly progressive destruction of the cell which constitutes its trophic centre. Cellulipetal changes of this kind may possibly be due to the circumstance that, after the connection of the cell with its terminals has been interrupted, the usual physiological stimuli, whether voluntary or reflex, and which promote nutrition, do no longer act, so that the cell wastes through the loss of these latter.

2. THE MYELINE SHEATH.—The special function of the nerve-fibre in the vertebrates only begins when the axone is surrounded by a normally developed medullary or myeline sheath, and the latter is therefore indispensable for the functional activity of the nervous mechanism in those animals whose nerves carry myeline sheaths at all. Changes in, or atrophy of, the latter, lead to grave functional disturbances in the nervous system, and there is a direct proportion between the development of the brain and the progress of myelination.

The masterly researches of Flechsig (¹²) on this subject have shown that certain fibres and sets of fibres, which in the adult are so inextricably welded together that they seem to be identical, may be plainly distinguished from each other at certain phases of embryonic life, since some of them are then still naked axones, while others have already become clothed with a sheath. The lower level of the brain, namely, the bulb and pons, is completely developed at birth, but the infant enters the world with immature hemispheres, the fibres of which are still unmyelinated. The infant, therefore, resembles Goltz's dog, from which the hemispheres have been removed; and there are only physico-chemical processes going on, which are quite devoid of any mental character. When the infant's physical wants are satisfied by breathing and taking food, it relapses into unconsciousness, and an apparently dreamless sleep. At that time of life there appears to be an almost total absence of lecithin, which forms the most important constituent of the adult brain.

Matured bundles of fibres are, when stained with hæmatoxylin, seen to course in the newly-born infant together with immature fibres which do not take any staining, and consist simply of transparent glass-like axones, which can often be followed up for a very considerable distance. After the fibres of the bulb and pons have become matured, development is seen to set in in those parts which constitute the *sensory centres.* Conducting paths are thus formed which connect sentient parts of the interior of the body, the muscles, and the organs of sense, with the grey cortex. The sensory areas are thus seen to be the internal terminations of the sensory nerves, and also contain the cells where the motor paths originate; showing that there are *no purely sensory nor purely motor areas in the cortex.* It is only after these sensory paths have become completely built up and myelinated, that a new development is seen to spring up in that much larger portion of the hemispheres which Flechsig has called the *association* or *mental centres,* and which have remained immature for several months after birth.

Ambronn (13) has recently given us a new excellent test for the progress of myelination, in the use of the polarised light. This test has the peculiar advantage that it does not, like osmium and hæmatoxylin, alter the structure of the medullary sheath; and it shows that this structure, in its course of development, undergoes definite changes in colour. The non-myelinated fibres and the connective tissue are by this means shown to be of a violet, indigo, and blue colour; while, in proportion as the fibre becomes myelinated, the colour gradually changes to purple, red, pink, orange, yellow, and white. The thoroughly matured myeline sheath eventually appears as a brilliant yellowish white fibre. The peculiar colour of the myeline sheath, when fully matured, appears to be owing to the presence of lecithin, which is absent when the sheath appears bluish green, and gradually increases in quantity as the changes in colour, as above mentioned, become established. Besides lecithin, which is the most important constituent of nervous matter, the sheath also contains protagon, cholesterin, and neurokeratin.

What is the object of the myeline sheath? It is unquestionably intended to serve as an insulator, so that electric currents may be conducted along the axone without diffusion. The resistance to passage is five times greater in the transverse section of the myelinated nerve-fibre than in its longitudinal section; so that the nerve current will naturally take the easiest way, and run along the longitudinal section. Myelinated fibres can therefore not act upon each other, or upon nerve-cells, and they are likewise unable either to receive impulses from unmyelinated fibres and dendrites, or to respond to them. The typical way of conduction of cell power is therefore through the axone, which is in intimate connection with the cellular protoplasma; and thence the stimulation is transmitted by all myelinated axones, without there being the possibility of transmission to neighbouring parts of the nervous system. Transmission is only possible where the myeline sheath disappears, and the axones become free, naked, and uninsulated.

In the *peripheral terminations* of the sensory organs matters are so arranged that the terminal ramifications of the axones are naked, *i.e.* devoid of myeline. Being thus unprotected, they are enabled to receive impressions from external stimuli. In order, however, that the propagation of such stimuli may take place in an orderly manner, the fibres are in their further course insulated against external influences; and this condition is only fully attained when the myeline sheath has become matured.

The *central terminations* of the sensorial organs are arranged on a similar plan. There, also, it is necessary that the last terminations of the axones should be devoid of myeline, and therefore able to transmit the stimulation, which has up to that time been insulated, to the dendrites of the cortical cells, and the second intra-cerebral conducting path originating from these cells.

The terminal ramifications of the *motor* nerves in the muscles are likewise devoid of myeline, so that the transmission of stimuli from these nerves to the muscular fibres cannot be interfered with by an insulating layer.

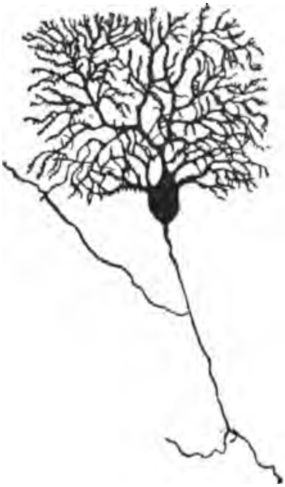

FIG. 3.—A Purkinje's cell from the cerebellar cortex of a kitten, fifteen days old, with numerous dendrites arising from the upper portion of the cell.—After Cajal.

3. DENDRITES.—The third and last constituent of the neurone is formed by the *protoplasmic processes* (Deiters ([14])) or *dendrites* (His ([6]), *pp*, *pp′*, Fig. 1). These arise from the internal margin and the sides of the cell, and divide, almost immediately after leaving it, into a number of different branches. The latter terminate with a free end between the dendrites of the neighbouring cells. The dendrites are broad and stout, and become gradually attenuated by division, like the antlers of a stag.

They always have a free end, which is either pointed, or furnished with a terminal knot. There are no connections either between the branches of the same cell, or those of neighbouring cells, which is clearly apparent on examining places where only few cells have taken the stain in the same neighbourhood, and where, therefore, no or only few crossings and overlappings of dendrites are to be found.

There is an infinite variety in the ways in which the dendrites originate from the cell, and become further ramified; and the various aspects of the nerve-cells are quite as much owing to this as to the differences in the shape of the body of the cell itself, which sometimes appears actually insignificant compared with the dendrites. The luxuriant development of these processes shows the bountiful way employed by Nature in her work.

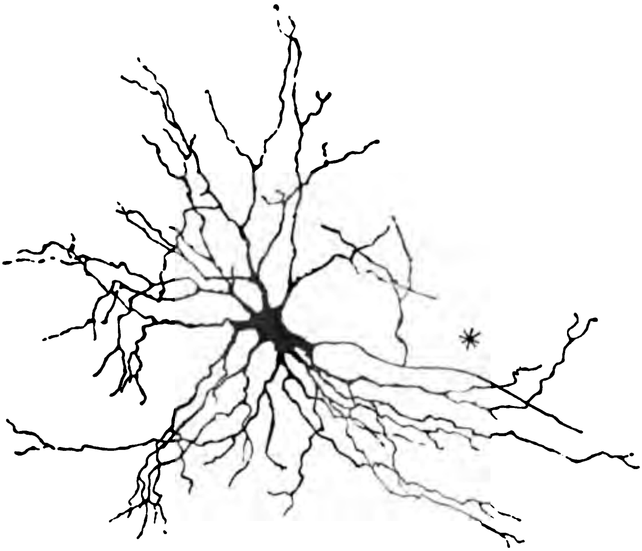

FIG. 4.—Anterior cornual cell from the spinal cord of a human fœtus, 30 cms. long.

The dendrites being of the same substance as the protoplasma of the cell, may be taken as having the same fundamental properties as the latter; and as their surface is enormously extended, they probably have an even higher susceptibility to nervous stimuli than the cell itself. In contrast to the axone, they act cellulipetally; and it is clear that the nervous functions can take place more easily in the enormously subdivided protoplasmic processes than in the cell itself. Otherwise it would be difficult to conceive why the dendrites should be so extremely plentiful as they are found to be.

Apart from their purely nervous function, the dendrites are concerned in the nutrition of the nerve-cell. Fresh lymph is always absorbed by the surface of the cell, while effete matter is excreted, likewise in the liquid condition. This metabolism is greatly facilitated by the enormous increase of surface which the cell obtains by its dendrites. Schiefferdecker (16) has drawn attention to the circumstance that in many instances a real cellular surface hardly exists, but has actually merged into its dendrites, so that the absorbing surface belongs almost exclusively to these processes. Absorption appears to take place from all parts of the dendrites, and not only from their points, as Golgi has been inclined to assume. This process has nothing to do with blood vessels, for it occurs at a time when no blood vessels have been formed, nutritive material being drawn from the lymph which permeates the whole of the nervous structures, and fills up all gaps left between them.

In a physiological sense the dendrites differ from the axones by conducting cellulipetally, while the axones conduct in general cellulifugally. Dendrites do not exist in the invertebrate animals, are scanty in fishes and reptiles, and become more fully developed, both as far as number and length are concerned, in the birds and mammalia. They are thus seen to have an important function, allowing of more intercellular associations, so that eventually a single sensation may lead to the co-ordinated action of a large number of nerve-cells. It is likewise a significant fact that the dendrites, as well as the collaterals, become gradually more ramified, more extensive, and more complicated in the human species as the fœtus develops, and during the first few years of extra-uterine life. Their growth, therefore, seems to be promoted in the same ratio as mental activity advances, and the system of association between the different cells of the brain becomes more fully developed. Mosso has shown that the act of fixing the attention on certain facts and ideas is connected with a physiological hyperæmia of certain areas of the brain; and it may be assumed that, when this is frequently repeated, the bulk of the protoplasma of the cell will be gradually increased, the dendrites will extend further, and new ones may spring up, at a time when the nerve-cell has already lost its faculty of multiplication.

The plasticity of the protoplasmic processes varies according to age; it is greatest in youth, diminishes in the adult, and disappears almost entirely in the aged. This explains why there may be such sudden changes of opinion in young people, when they are suddenly withdrawn from the influence of parents and guardians, while such changes are rare in middle life or old age. The objection to new things and ideas, which is so prevalent in old age, may also thus be accounted for.

Whether there is a special chemical compound, to which consciousness is bound, is not known ; it is, however, certain that consciousness cannot continue, even for a second, if the supply of arterial blood to the brain is interrupted; and we must therefore conclude that a continuous oxidation of the ganglionic cells is necessary for consciousness. It is likewise certain that the presence of lecithin is inseparably bound up with the matured condition of the neurone.

The principal anatomical factors of the activity of the brain are therefore the nerve-cell, the axone, and the dendrites; while its work is likewise influenced and modified by the degree in which the blood vessels of the brain are filled, by the quality of the nutritive fluid, the width of the perivascular lymphatic spaces of the grey matter, and the state of vasomotor excitability by means of which the quantity of blood which, under the influence of volition and attention, is thrown into the several portions of the brain, may be altered.

In spite of all these results of modern scientific research, we appear to be as far as ever removed from a comprehension of the mode in which nerve-cells respond to the action of external stimuli, or act when movements are carried out, or sensations perceived, or mental operations connected with thinking and volition are performed. Indeed, we seem in this respect still to be very nearly on that low level which was so cleverly described by Stenson (17) more than two hundred years ago (1671). He remarked that, "notwithstanding the great advances which had been made in our knowledge of the brain, the human mind, which had carried its investigations right into the heavens, had not yet been able to comprehend the nature of the instrument by which its own operations were performed, and that its powers seemed to abandon it as soon as it turned its attention to the organ in which it resided."

A new hypothesis, recently proposed by Rabl-Rückhard (18) on this point, has therefore attracted considerable attention. This author starts with the assumption that the conglomerate of the finest nervous fibrils in which the dendrites terminate (neuro-spongium, Waldeyer) is bound to play an important part in the processes of all higher nervous functions. It is evidently there that the exchange of the different molecular processes takes place, the focus of which is in the cells themselves. Each pyramidal cell of the hemispheres must be looked upon as the carrier of a definite number and kind of perceptions and recollective images, the sum-total of which is called memory. All our highest mental action would thus be only the constantly varying combination of the single perceptions accumulated in the molecules of the cells, or at least bound to them as to its material base. He further argues that this fine network is not anything unchangeable, rigid, or fixed, but has during life a vigorous mobility and constant change of communications; in other words, the dendrites are subject to *amœboid changes.* When we are thinking, the fine ramifications of the dendrites may be supposed to be in ceaseless motion, to stretch themselves to enter into a temporary connection with others, and to become separated again at other spots. Thus a kind of mechanism of mental actions may be conceived. A thread of thought which is cast away may, in this way, be equivalent to a torn-off dendrite of a memory cell; an ingenious combination analogous to a temporary connection of different ganglionic cells, the dendrites of which are endowed with particularly vigorous amœboid motions; while intellectual languor would be owing to a slow play of the same processes. Sleep, dreams, hypnotism, etc., might thus be assumed to be only phenomena of partial palsies of the dendrites of certain ganglionic cells.

However ingenious and attractive this theory may appear, it suffers from the incurable fault of being utterly unsupported by facts. This is also the case with the modifications of Rabl-Rückhard's hypothesis, which have been started by Tanzi (19), and Lugaro (20). They consider that slower movements and motions of growth occur in the ends of the neurones during mental activity. Now there can be no doubt that the neurones are slowly developing and growing during the first few years of extra-uterine life, and probably at a later period, in proportion to the mental development of the person concerned; and that they assume a higher degree of perfection in persons of mental ability and culture than in uneducated people; while, on the other hand, retrogressive changes take place, not only as age advances, but also in diseases of the mind. These processes, however, can scarcely be termed amœboid.

I have for many years past been of opinion that *the work of the brain-cell is of an electrical nature*. As such questions can only be settled by systematic researches in physiological laboratories, it is much to be regretted that physiologists should have until now occupied themselves so exclusively with the electricity of the nerve and muscle, and have neglected the study of the electricity inherent to the nerve-cell, which is a far more important subject. Even in the most recent work (21) on animal electricity, we find very little more than such general statements as, that active matter is electro-positive to inactive matter, that more active matter is electro-positive to less active matter, and matter whose action is lowered, is electro-negative to matter whose action is normal; that electrical changes are a measure of physiological activity, that electrical effects accompany a natural discharge of nerve impulses, as well as the impulses aroused by all artificial stimuli, whether these be or be not of electrical origin, and that an electrical stimulus is not necessary to produce an electrical effect. Aphorisms of this kind are not likely to advance our knowledge of this important subject.

The following remarks are therefore only intended to be suggestive :—

In 1881, I (22) drew attention to the fact that the grey cell may be appropriately likened to a galvanic battery in which an electric current is generated, and the white matter to telegraph wires, which conduct the current to any place where it may be required. Again, in 1894, I (22) compared the laws which govern the action of artificial electricity with those which rule the action of the nerve-cells. The principal law of electricity is Ohm's, which is to the effect that the current strength (C) is equal to the electromotive force (E), divided by the internal or essential resistance which it encounters in the circuit of the battery (R). The formula for Ohm's law is therefore $C = \frac{E}{R}$. Now the action of the neurone (N) may be similarly expressed by saying that the energy which may be manifested by it is equal to the force evolved (F), divided by the resistance which it experiences within the cell (R). The formula for the nerve-cell is therefore $N = \frac{F}{R}$. The energy of the nerve-cell thus depends, first, as that of the galvanic battery, upon production of force and resistance; and lack of power in, or absolute inactivity of neurones may thus be owing either to diminished force production, or to increased resistance within the cell. In the same way as the battery current will become weaker by certain changes in the voltaic pair, such as rusty metals, deteriorated or decomposed exciting liquids, etc., and must eventually cease to flow unless the elements are renewed, deposits cleared off, and exciting fluids renewed, so damage to the nerve-cell, with diminished chromophile substance, attenuated nucleus, etc., must lead to failure of power, lack of decision and initiative, defective memory, and impaired mental and physical activity altogether; and it will only be possible to resume work when waste matters are eliminated, and fresh nutritive material, with an abundance of oxygen, is supplied to it. When the zinc of the battery is completely oxidised, and the exciting liquids have been decomposed, the current must disappear altogether. Similarly, when the supply of nourishment and oxygen is entirely cut off from the neurone, total loss of its function is the inevitable result. When a battery still contains some unoxidised zinc, and part of the exciting liquids has not been decomposed, the current will not completely disappear, but becomes greatly diminished in strength; and just so with the neurone in which the blood supply is only lessened, but not entirely cut off, there will not be absolute functional death, but fatigue and impaired energy.

The neurone, however, is not only a producer of force, like a galvanic battery, but can act also as an accumulator, becoming charged with force, and able to store it up. Where a proper balance of accumulated force is wanting, there can be no sustained power, either in mental or physical work, and comparatively trivial efforts may thus lead to expenditure of the small modicum of power which may be present.

I would carry this analogy still further, by comparing the *external or non-essential* resistance which, in a galvanic battery, is encountered by the current in its passage through conductors, with the external or non-essential resistance which is offered to the nervous force when travelling from the brain-cell of the cortex and subcortical centres through the white conducting fibres in the lower levels of the brain, the spinal cord, and the peripheral nerves; and this may occur at any portion of these conducting strands.

We have already seen that the myeline sheaths of the axones are intended to serve as insulators, so that electric currents may be conducted along the axones without diffusion, and that the resistance to passage is five times greater in the transverse section of the axone than in its longitudinal section. There is, therefore, isolated conduction along the whole of the fully matured nerve-fibres, up to the point where they reach the peripheral or central terminations of the sensory organs or the muscles, where the myeline sheath disappears, and the axones become naked and free, allowing of the transmission of stimulation.

The axones of the neurone and the rheophores of a galvanic battery therefore resemble each other like twins. In both there is an insulating and conducting substance. The insulating material in the axone is the myeline sheath, while in the rheophone of the battery it is silk, wool, indiarubber, etc. The conducting substance in the axone is the semisolid axis-cylinder, which occupies the centre of the structure, just as the copper or brass wires of the rheophore. Finally, the ends of both axones and rheophores are free, in the axone by dropping the myeline sheath, and in the rheophore by having an uninsulated metallic end. Both axones and rheophores also have a free central and peripheral end, without which they would be unable to act. This part of my theory indeed appears to be perfect, and I am thus encouraged to hope that the other parts of it, which still lack confirmation, will receive it in time.

The trophic influence of the nerve-cell upon its processes is probably a kind of induction, proceeding from the nucleus of the cell to the end of the axone, *and such action may be either electrolytic, or cataphoric, or both,* so that chemical and physical conditions suitable for the assimilation of nutritive fluid would constantly be in operation.

(*a*) *Increased resistance.*—It has been generally assumed that in failure of nerve power only the production of nervous force is diminished, and little account has been taken of resistance; but the symptoms in many cases, more especially where paresis is the principal feature, seem rather to point to unduly *increased resistance* than to diminished force production. Force seems in many cases to be still there, but it cannot be utilised by the patient, since he is unable to overcome the resistance offered to its liberation.

(*b*) *Lessened resistance.*—This may be assumed in those likewise very numerous instances in which we have to do with undue excitability and the various forms of hyperæsthesia, analogous to what we find in the frog's nerve when this has become fatigued after separation from the body, and repeated stimulation (Pflüger, von Bezold, Wundt). In such cases resistance is so much diminished that conduction is unduly facilitated, in consequence of which the slightest stimulant elicits a violent response, which is out of proportion to the force of stimulation which has been used, and which after a time is followed by complete exhaustion.

Another reason which induces me to assume an intimate connection between failure of nerve power and inefficient production of animal electricity in the living nerve-cell, is the extraordinary effect which, in a large proportion of cases of this neurosis, is produced by a judicious application of artificial electricity to the suffering part. From what I have observed, during a practice extending now over a very lengthened period, I am inclined to think that when electricity fails to do good in such cases, this is owing either to defective diagnosis of the seat of the trouble, or to an injudicious mode of application. Accurate localisation is essential for success with this treatment. It has happened in several cases, which have been under my care at various times, that no progress was perceptible while I applied the electricity to a certain area of the brain which I first believed to be affected; and that when, on further consideration of the symptoms, a different district of the organ appeared to me to be at fault, and I therefore altered the localisation of the current, a successful result was obtained. Such occurrences not only give strong support to my theory, that an unsatisfactory condition of brain currents may be improved by artificial electricity applied to the suffering area, but likewise afford a proof that the influence of suggestion, for which now anything and everything is claimed in therapeutics, does not enter to any extent as a factor into electrotherapeutics. If suggestion were the active agent, it is much more likely that it would do its work in the beginning of the treatment than after the latter had been for some time ineffectual, whereby any suggestive force inherent to the proceeding must have been lessened rather than increased.

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OBSERVATIONS ON TWO CASES OF MEDIASTINAL TUMOUR IN WOMEN.[1]

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(Plate XVII.)

In the month of August 1896 two cases were admitted into Ward 28, presenting evidence of intrathoracic tumour. One of these was in an elderly woman, and in her the diagnosis of thoracic aneurysm was easily made. The other was in a young girl, and here the nature and exact position of the lesion were from first to last undetermined, although the clinical history and physical signs yielded information sufficient to render it in the highest degree probable that a neoplasm was present in the posterior mediastinum. Each of these cases presented features of clinical interest alike in their progress and their results, which seem to render them deserving of a brief record.

Case 1.—*Case of aortic aneurysm with a peculiar termination.*—Jane L., æt. 68, a sempstress, was admitted on 22nd August 1896, suffering from pain in the chest, accompanied with cough and dyspnœa, which had existed for about two years, but of late had become markedly worse. For a month prior to her admission the cough had been particularly hard, dry, and barking; and it is this symptom especially which she complained of. Pain has for some time been felt over the region of the heart, which radiates up to the left shoulder and left arm, also up the left side of the neck. The breathlessness has been increasing during the past six months, is specially severe on exertion, and is accompanied with a sense of throbbing in the chest.

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[1] The substance of a clinical lecture delivered in the Royal Infirmary.

The patient, who has an alcoholic history extending over many years, is a small spare woman with a worn appearance. She is unable to lie down, and her breathing is observed to be audible and of laryngeal character as she sits propped up in bed.

On inspecting the front of the thorax, a prominence is seen on the chest wall, at the second and third left sternocostal articulations; and over this there is a marked visible pulsation, while the whole præcordium appears to be lifted at each cardiac systole. The apex beat of the heart is slightly displaced downwards and outwards. Palpation confirms inspection, and reveals a distinct expansile pulsation over the second and third costal cartilages, and in the episternal notch, where also a thrill can be felt. Percussion gives extensive dulness over the left front. On auscultation a loud systolic bruit is audible over the whole front of the chest, and particularly so over the prominent area. The second sound is accentuated, and occasionally a faint diastolic murmur may be made out. The pulse is regular; the right radial is, however, somewhat later than, and about one half the volume of, the left. There is evidence of some œdema at the bases of both lungs posteriorly. The patient's voice is weak and toneless. Laryngoscopic examination shows complete abductor paralysis of the left vocal cord.

The diagnosis of aneurysm of the transverse and possibly the commencement of the descending thoracic aorta was made, and the patient was placed under appropriate treatment. Entire rest in bed was enjoined, along with a light diet. Iodide of potassium was given in full doses. Within less than a fortnight a notable improvement was observed in all the symptoms, there being now scarcely any cough and no dyspnœa. Still more striking was the diminution in the size and pulsation of the tumour, to such an extent as to render it barely palpable. The patient expressed herself as feeling better in every way. This improvement continued up till a few days prior to death, when the tumour was noticed to have become distinctly larger and the pulsation in it much stronger, while the patient's whole condition was less comfortable.

On the morning of 3rd October she was sitting up in bed, when she suddenly complained of great pain in the chest, became extremely livid, and enormously swollen in the face and neck, presenting altogether a hideous appearance. Unconsciousness seemed complete, and the breathing became shallow and feeble. Death supervened in less than ten minutes after the seizure.

Extract from report of post-mortem examination, made by Mr. Leith fifty hours after death.—"Neck considerably swollen and dusky. Left pleural cavity contained about 4 oz. of clear fluid; the right, 1 oz. Pericardial sac empty. A large aneurysm was found to be present on the arch of the aorta (see Plate XVII.). The sac involved the end of the ascending and the whole of the transverse arch; and although not apparently including the descending, this portion of the arch was dilated. The aneurysm lay in close relation to the trachea and œsophagus, but these structures had not been displaced. The sac measured 4½ in. transversely and 3 in. antero-posteriorly. It contained half a pint of liquid blood, and a large, flat, stratified clot on its left side posteriorly, which had been almost completely detached from a thin rough clot adherent to the posterior wall of the sac. It was just at this point of slight adhesion that the aneurysm had ruptured by an irregular tear, 1½ in. long by ⅓ in. wide. From the point of rupture the blood had passed into the tissues of the posterior mediastinum, and had saturated them as low down as the bifurcation of the trachea. At the seat of rupture the blood lay on either side of the vertebral column, but not between the sac and the latter. The sac was greatly thinned by pressure against the vertebral column, but was not adherent to it. At this part, however, corresponding to the bodies of the first dorsal and left cervical vertebræ, the thinness of the sac and the stretching of the cellular tissue of the posterior mediastinum, by contained blood clot, made the separation of the aneurysm a matter of considerable difficulty. The blood had not come forward, but had passed upwards behind the trachea, larynx, pharynx, and dissected extensively between the muscles of the neck, which seemed to lie embedded in blood clot, extending up in some places as far as the base of the skull. Its extravasation must have exercised strong compression upon the pharynx and larynx. The left vagus and recurrent laryngeal nerve were incorporated with the sac. The innominate artery and the left carotid and subclavian came off from the hinder part of the sac. The heart was normal, as were also the lungs and other organs."

Apart from the rarity of thoracic aneurysm in women, as compared with men, there are two outstanding features of clinical interest in this case:—

1. The remarkable improvement in the symptoms and change in the physical signs which showed themselves very shortly after admission. The cough and dyspnœa subsided so as to be no source of trouble to the patient, while the subsidence of the pulsating tumour, to such a degree as to be with the greatest difficulty made out at all, was far beyond anything I had ever witnessed of the effects of quietude in lessening the physical signs of an aneurysm. The facts revealed by the post-mortem examination would seem to make it doubtful whether this change was due merely to rest, and, on the other hand, rather to suggest another explanation. In the aneurysm a large firm clot lay loose, having the merest attachment to the back wall of the sac. This clot had evidently been quite recently detached by the blood current

getting in behind it; and, as this went on, the mass of clot would be pushed forward towards the anterior wall of the aneurysm, thus reducing the expansile pulsation to be felt in the tumour. At the same time the blood stream was left free to play upon the weakest and thinnest part of the sac, and to precipitate the rupture. The slightly adherent clot would at each pulsation pull the wall of the sac in one direction, while the blood stream would tend to bulge it in the opposite.

2. The unusual manner and result of the rupture. From the description of the seizure, I confess I was led to expect a large escape of blood into one pleural cavity, or possibly into the pericardium, but neither of these events occurred. The rupture took place into the cellular tissue of the posterior mediastinum, immediately in front of the vertebral column. The extravasated blood was encapsulated in the cellular tissue, but made its way upwards into the neck, spreading out and insinuating itself between the muscles. The course of the escaped blood accounts for the symptoms and appearances presented by the patient just before death, namely, the great swelling of the neck and face, and the extreme lividity. Asphyxia from compression of the trachea, larynx, and muscles of the neck was obviously an important contributory, if indeed it was not the immediate, cause of death. I have not been able to find records of any case presenting an exactly similar termination.

CASE 2.—*Case of mediastinal tumour encroaching on the left lung.*—Janet D., æt. 23, a bleacher from Kirkcaldy, was admitted on 25th August 1896, suffering from pain in the left side of the chest, which had existed for several weeks.

The patient has a tubercular family history, but up till eighteen months ago she has been quite strong and able for her hard work. At that time she had an attack of influenza, and she has since then never felt quite well, although it is only within the past few weeks that she has had any definite local complaint.

The patient's appearance is that of a well-nourished girl; but her colour is a little dusky, and she has a somewhat worn expression, doubtless due to the fact that she has had severe suffering for several weeks past, especially by night. The various functions of the body seem normal, with the exception of menstruation, which has been absent during the past eight months.

Examination of thorax.—On *inspection* anteriorly, the most marked appearances are a deficient expansion of the left side of the chest, and a slight degree of fulness of the supraclavicular fossa, together with a greater prominence of the veins of the neck on that side, as compared to those of the right side. The second left costal cartilage seems to project to a slight extent. Posteriorly there is a certain amount of deformity of the neck. It looks short, and the vertebræ from the fifth cervical to the second dorsal are curved backward, and seem also inclined somewhat to the right side.

Palpation confirms inspection, as regards the very much feebler expansion of the left than of the right side. Vocal fremitus is entirely absent over the left apex anteriorly and posteriorly. On laying the hand flat on the chest, a distinct fulness is felt over the second left costal cartilage. In the episternal notch, when the head is bent forward, a certain degree of resistance is felt, but no well-defined tumour and no abnormal pulsation. The heart's apex is not displaced.

Percussion—Anteriorly, there is absolute dulness over the sternum, from the episternal notch down to the level of the fourth rib. This dulness extends beyond the left border of the sternum for fully 1½ in. Posteriorly, there is absolute dulness, with strong sense of resistance in the whole of the left supraspinous fossa. Below the spine of the scapula the note is somewhat impaired over the whole of the left lung. The percussion note on the right side is quite good, both anteriorly and posteriorly.

Auscultation.—Over the whole of the dull area above described, there is complete absence of the breath sounds and of vocal resonance. Over the rest of the left lung the breath sounds are decidedly diminished, as compared with the right side. Auscultation over the right lung reveals harsh vesicular breathing both anteriorly and posteriorly.

A faint systolic murmur is heard over the dull area, but, as already stated, there is no pulsation. Measurement shows an appreciable difference between the two sides of the thorax.

Sept. 15.—There has been no change in the patient's condition. She suffers much pain, particularly by night, and has frequently to have opiates administered.

Sept. 24.—In the left supraclavicular fossa a densely hard gland, about the size of a small marble, can be felt.

Sept. 29.—Patient complains of slight difficulty in swallowing.

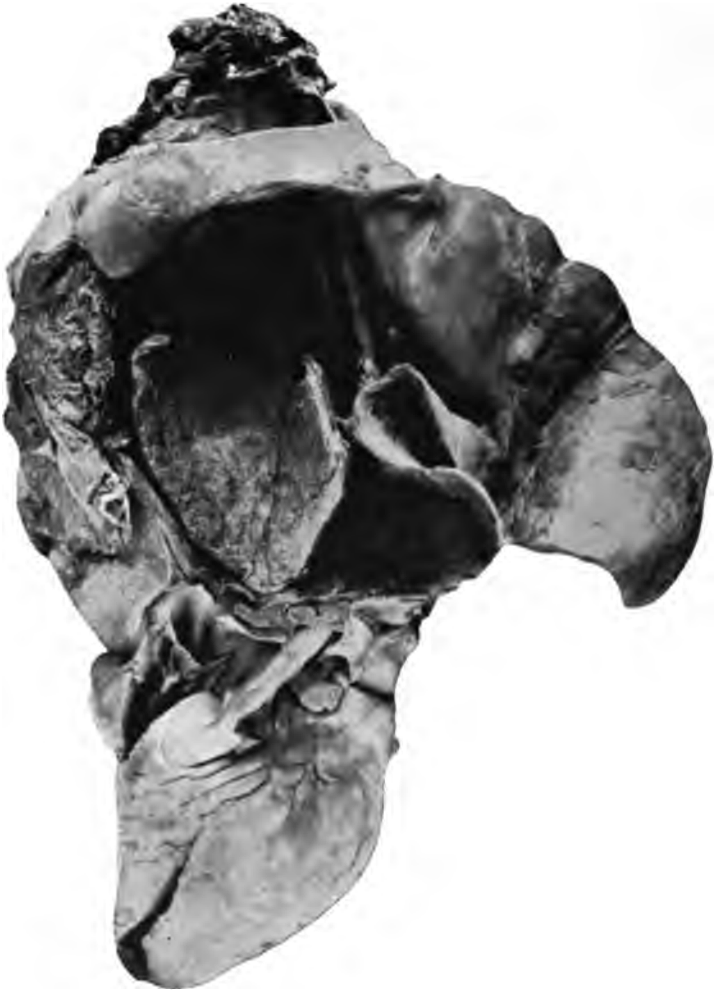
October 10.—A few enlarged glands on the thoracic side of each axilla can now be made out. Pain still continues in the upper part of thorax posteriorly, although scarcely so severe as formerly.

October 20.—Pain is complained of in the left arm. No œdema can be made out.

October 26.—Patient wished to go home for a time, and was discharged to-day, somewhat relieved as regards the pain, but with the general symptoms and physical signs *in statu quo*.

She was never able to return to the Infirmary, but I heard from time to time of her progress, and I paid her a visit in her home in December. She had by this time developed complete paraplegia, and there appeared to be a considerable projection of the vertebræ in the upper dorsal region. Any detailed examination of her condition was impossible, owing to her weak and helpless condition. She lingered on till February, when she died. No post-mortem examination was obtained.

The main point of importance in this case was the diagnosis, which it was never possible to establish. The symptoms, and especially the physical signs, indicated some form of thoracic tumour. The extensive area of absolute dulness over the manubrium sterni and upper part of the left front of the chest could not be accounted for by any condition of the lung, for no pul-



monary symptom existed; while, on the other hand, it strongly suggested some growing tumour, which was gradually pushing the left lung aside. Two views suggest themselves, either of which has certain considerations in its favour.

1. It may have been a sarcomatous tumour of the mediastinum. The age of the patient forms no reason against it, growths of this kind being by no means unheard of in the young. In volume iv. of the *Hospital Reports*, a case very similar to this is recorded by me as having occurred in a young man, and there the diagnosis was verified post-mortem. This question, however, might arise—Would a growing tumour of this character be likely to exercise such pressure upon the vertebræ, as to lead to their curvature, and ultimately to produce paraplegia? There is no antecedent improbability of this. It is to be borne in mind, too, that the curvature referred to was not of one or two vertebræ, but seemed rather to be a general backward bend in the lower cervical and upper dorsal region; indeed, such as one might expect from a large tumour growing in the posterior mediastinum in close relation with the spinal column.

2. The tumour might be a mass of tubercular glands in the mediastinum, and the spinal curve and paraplegia be due to a tubercular affection of the vertebræ, to which the glandular enlargements were secondary. The family history lends countenance to this view. But there are certain difficulties not readily explained away. The course of the temperature was not that usually observed in a rapidly spreading tubercular development, and further, there appeared to be no implication of the substance of the lung, which might have been expected in an active tubercular process progressing in its vicinity. Nevertheless, on a careful survey of all the points in this case, and especially in respect of its later developments, this view commends itself to me as upon the whole the more probable of the two.

The difficulty of arriving at an accurate diagnosis in this case recalls a somewhat similar experience many years ago. A man, æt. 45, suffered from severe pain in the thorax, radiating from the back to the sternum. This pain had existed some two or three years before he came under my care, and he had been seen by several physicians of the highest standing. By most of them the patient was regarded as suffering from a deep-seated thoracic aneurysm, and the one remedy advised was large doses of iodide of potassium, which appeared to afford some relief to the pain. This relief, however, proved only temporary, as the pain recurred, and became most agonising. For a considerable time I suspected the existence of some malignant neoplasm in the posterior mediastinum, a view which seemed to derive some support from the feeble and emaciated condition into which the patient had fallen. Gradually there appeared a distinct prominence of the spines of the upper dorsal vertebræ, which had previously been entirely absent, and this was followed, in time, by well-marked paraplegia. Some time before death the patient began to cough, and brought up large quantities of extremely fœtid expectoration, suggesting gangrene of the lung.

On post-mortem examination it was found that there was neither aneurysm nor tumour, but extensive tubercular disease of the bodies of the two upper dorsal vertebræ. To this the apex of the left lung had become adherent, and a large gangrenous cavity existed at that part.

THE DIAGNOSIS OF THE POSITION OF THE INTERVENTRICULAR SEPTUM IN SOME CASES OF CARDIAC DISEASE, BY MEANS OF THE CONDUCTION OF THE SECOND CARDIAC SOUNDS.

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IN the normal heart the second sound is composed of two perfectly blended factors, produced by the closure or the tightening of the membranous semilunes of the aortic and pulmonary valves. The two incidents are exactly synchronous, and therefore but one sound is heard over the whole cardiac area, more or less distinctly as the ear is placed nearer to or farther from the point of production. The quality of the two sounds is similar in the functionally perfect heart, and even if we listen over the pulmonary and aortic cartilages in turn (*i.e.* the points nearest to the respective semilunar valves) we shall be unable to differentiate the two elements.

Over the pulmonary artery the preponderating part of the sound is composed of the pulmonary factor. At the aortic cartilage the chief portion of the sound is formed by the aortic closure.

But not only are the separate parts of the second cardiac sound heard most loudly at the point on the chest wall which is nearest to their respective valves, but the conduction of each sound is in accordance with the ordinary physical laws of acoustics. The fewer media that vibrations have to pass through the better is the conduction; hence the pulmonary second sound is heard more plainly over the right ventricle, while the aortic second sound is best heard over the left ventricle. (By the right and left ventricle it is understood that reference is made only to those portions of the ventricle which approach the anterior chest wall.) One complication to this rule of conduction is introduced by the presence of the bony sternum, which is capable of conducting downwards the sound produced at the aortic valves when it is accentuated owing to dilatation of the aorta; and this conduction is probably due to the close apposition of the aorta to the portion of the manubrium sterni in its neighbourhood. Again, when the two second sounds of the heart are equal in quality and intensity, we shall not be able to differentiate them in the ventricular area.

For the perfect proof of these physical properties we depend upon the study of disease. If through an alteration of tension in either artery, or through an increased rigidity of the valve, the character of either sound varies from the normal, especially in loudness, it then becomes possible to distinguish one from the other. At their point of production this is a well-recognised fact, and we are accustomed to say with confidence that the second pulmonary or the second aortic sound is accentuated or weakened. This is a common and familiar observation at the base of the heart. I notice that in an excellent little work by Ewart on "Cardiac Outlines," the conduction of the second sounds is limited to a circumscribed area around the sternal end of each second intercostal space.

The separation of the two second sounds of the heart is indeed rarely recognised in the case of the ventricular area of the cardiac dulness, with the single exception of the weak aortic second sound heard at the apex of the heart in cases of mitral stenosis; and it is the object of the present brief note to emphasise the importance, from a diagnostic point of view, of separating these sounds in the above areas, at least in certain cases of cardiac disease. In other words, it is quite possible, when one or other of the two factors of the second sound is intensified, to determine, from the conduction through the great cardiac cavities, the exact position of the interventricular septum—in short, to define with some exactness the size of the two ventricles in their relation to the anterior thoracic walls. This is a refinement of diagnosis, but one not without its value, as I shall endeavour to show.

A study of cases of mitral constriction demonstrates unmistakably the conduction of the sounds to their respective ventricles, because there is usually a considerable difference between the intensity of the aortic and pulmonary sounds.

In a well-marked case, tension in the left auricle and in the pulmonary veins is greatly increased, and the transference backwards of this increased blood pressure through the pulmonary vessels causes the tension in the pulmonary artery to be so raised that its semilunar valves are closed with greater force than usual. The pulmonary second sound is accentuated, and may even anticipate the aortic, producing a want of synchronism in the closure of the two valves and a doubling of the second sound. On the other hand, the aortic second sound is weakened because tension is low in front of the obstruction, and the left ventricle is often imperfectly filled in cases of pure mitral obstruction. With this marked discrepancy in the two sounds, we listen at the apex of the heart for the sign of a weak aortic second sound, and, finding it feeble or even absent, we confirm our opinion that it is the aortic sound that is thus altered by listening at the right base of the heart.

In mitral stenosis the left ventricle is usually hypertrophied, due, I believe, to the fact that in all the early stages of the disease the same chronic process which puckers and thickens the mitral cusps, and prevents the free passage of the blood stream between them, also prevents their perfect closure, and produces mitral reflux, a condition which has an effect on the tension in the left ventricle exactly opposed to that of an uncomplicated mitral obstruction. Thus, in some cases of considerable stenosis, the apex of the heart is still formed by the left ventricle, in spite of the great dilatation and increased area of the right ventricle.

It is not difficult, in the presence of this marked difference between the two second sounds, and bearing in mind the conduction of each in great measure to its respective ventricle, to determine how much of the right ventricle or the left takes its share in forming the cardiac dulness mapped out by percussion on the anterior chest wall.

Take the following case in point:—

Case 1.—The diagram represents the superficial area of cardiac dulness in a girl æt. 15, an out-patient at the Brompton Hospital, who is the subject of disease of the mitral valve, of about twelve months' duration.

When the stethoscope is placed at the apex of the heart (*a*) in the fifth intercostal space, which in this case was about 1 in. to the left of the nipple line, a presystolic murmur is heard, and the first cardiac sound is partially obscured by a long systolic murmur. The second sound is exceedingly feeble. As the stethoscope is passed in a horizontal line at the level of (say) the fifth intercostal space towards the sternum, a point is reached (*b*) where for about a finger's breadth two second sounds are faintly heard, giving the impression of a cantering action. Directly the line (*b*) is passed the presystolic murmur fades, and the second sound becomes loud and distinct. This second sound persists over the whole of the remainder of the cardiac area, until its right border is reached, far to the right of the sternum. At the base of the heart the second aortic sound is feeble, and the second pulmonary sound accentuated. There can be no doubt that (*b*) represents the interventricular septum.

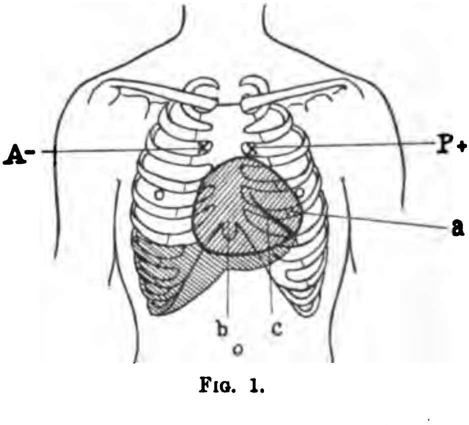

Fig. 1.

Case 2 is a case of mitral stenosis and incompetence, but there is also aortic regurgitation. The apex of the heart is in the sixth interspace in the left anterior axillary line, and the impulse is heaving.

At the apex there is a presystolic and a systolic murmur with a long purring thrill, and the second sound is absent. As before, the stethoscope is first placed at the extreme margin of the cardiac dulness to the left (*i.e.* at the apex), and moved in the direction of the arrow at the level of the sixth rib to the right margin. No second cardiac sound is heard until the line (*c*) is reached, representing the position of the septum. Here a second sound is faintly heard, becoming well marked and loud over the whole area marked (*b*), which is evidently right ventricle. In this case no reduplication of the second sound was observed. At the base, in the aortic interspace, a soft diastolic murmur could be heard, and the pulmonary sound was again accentuated.

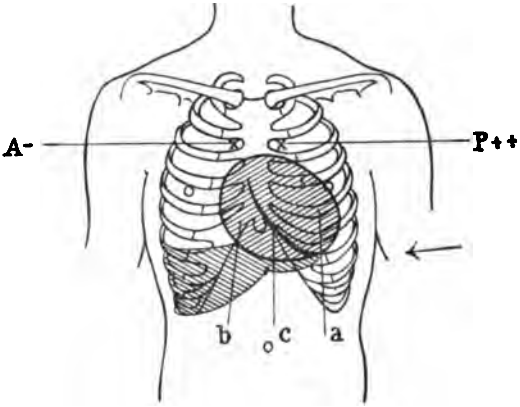

FIG. 2.

In some cases of mitral obstruction (though these are few and far between) the theoretical and typical condition of left ventricle prevails, and the ventricle is small and atrophied. In these cases there is usually extreme stenosis of the valve. The right ventricle becomes enormously dilated, and occupies the entire area of cardiac dulness, and the true apex of the heart is no longer formed by a portion of the left ventricle.

Under these circumstances it is not uncommon to hear the systolic murmur of tricuspid regurgitation over the whole cardiac area, and nothing but a sharp snap or click represents the first sound at the extreme limit of cardiac dulness to the left. The absence of a presystolic murmur has sometimes led to an error of diagnosis, and I have known the systolic murmur to be mistaken for that of mitral regurgitation. Such a case, in which this error was made, was narrated to me by a colleague, and the true condition was only discovered on the post-mortem table, when the mitral orifice was found to be so constricted that it would only admit a large probe.

My contention is that such a mistake ought not to be possible, if due attention were paid to the area of distribution of the accentuated pulmonary sound.

When the reverse condition is present, and the accentuation of the aortic second sound is the prominent feature, the conduction of the aortic sound down the sternum interferes with this physical sign, for it is well known that a booming sound produced by the aortic closure in cases of dilatation of aorta or high arterial tension is not confined to the basic area of the heart, but, though diminished in intensity, is well heard as far as the diaphragm. At the same time, I have seen cases where, with a high arterial tension, the accentuated second sound was chiefly conducted to the apex of the heart, but this is an exception.

It is, therefore, mainly in cases of mitral disease that this conduction of the second sounds to the ventricular areas is of importance. Though it may appear to be a small point, any information which enables us to speak accurately as to the relative size of the two ventricles is of value, not only to indicate the presence or absence of compensatory changes, but even indirectly to throw light on the prognosis of the disease.

ANTISEPTICS IN AURAL SURGERY.

By Arthur H. Cheatle, F.R.C.S., *Surgeon to the Royal Ear Hospital, and Senior Aural Clinical Assistant, King's College Hospital, London.*

When Lord Lister reduced the mortality in cases of fracture of the base of the skull involving the temporal bone, by purifying the external ear and meatus, and applying an antiseptic dressing, he taught aural surgeons a lesson, which perhaps we do not even now fully appreciate, for it demonstrated that antiseptics could be applied to the ear in just the same way as to other parts of the body, and that, therefore, operations on the intact drum and meatus could be performed without the risk of suppuration and its sometimes most serious results. The importance of this cannot be overestimated, for, if the relations of the middle ear and its antrum be considered, the dangers of inflammation occurring in the cavities is really an appalling one, the only wonder being that serious complications and sequelæ are not more common than they are.

The question most often addressed to Lord Lister concerning his treatment of basal fractures involving the temporal bone was, "whether the Eustachian tube was not a possible path for infection?" His answer was, that the cilia lining the tube safeguarded the path; and we now know that, owing to the nasal passages having a sterilising action (St. Clair Thomson and Hewlett), an additional guard is present, so that, given a healthy nose and naso-pharynx, the Eustachian tube can be left out of consideration as a path for infection; as can also the intact middle ear.

The purifying of the auricle and meatus is then a vital question for the aural surgeon, and must always be before him, for unless it is performed his operations must be a source of anxiety to himself, and a risk to his patients, not only when operating on an intact drum and meatus, but also when operations are necessary in cases where suppuration already exists, for it is important that no further infection should take place. There is no doubt that the thorough purification of the meatus demands great care and takes time, the chief difficulty lying in the cartilaginous portion.

On looking into an ear, without introducing a speculum or displacing the auricle, it will be seen that the cartilaginous meatus is lined with fine hairs, which project into the passage; and that these hairs, growing on projections caused by the curve of the meatus, at different levels completely obstruct the lumen, serving, together with the cerumen and the meatal curves, to arrest minute foreign particles; these hairs, in fact, performing the same duty as those lining the vestibule of the nose (Thomson and Hewlett). It can well be imagined that the cartilaginous meatus is teeming with micro-organisms, and I have found that such is the case. In six normal ears examined, I obtained growths on agar-agar from the cartilaginous, but none from the deep meatus; the platinum loop being simply drawn along the wall in each situation. This, of course, is by no means a conclusive investigation, but at least it is a suggestive one. While serving as house surgeon, I syringed, when necessary, the ears of basal fracture cases with *strong mixture* (a solution of carbolic acid of 1 in 20, in which is $\frac{1}{500}$th part of perchloride of mercury) before purifying the auricle and surrounding parts and applying the double cyanide gauze dressing. No harm resulted beyond desquamation, a very small price to pay for asepticity; thus showing that even the strongest solutions can be well borne.

I have lately been purifying the meatus in the following way:—All foreign matter, cerumen, etc., is first syringed out with 1 in 40 carbolic, a soft mop being used if necessary; the cartilaginous meatus, auricle, and surrounding parts are then firmly rubbed with strong mixture, or 1 in 20, a mop being used for the first, and finally strong mixture, or 1 in 20, is allowed to remain in the deep meatus for a quarter of an hour, the patient's head being placed on one side with the affected ear uppermost. It is well to have this done a short time before operating, a light plug and dressing of the gauze, well wrung out in 1 in 20, being applied in the meanwhile. In children care must of course be taken in using the carbolic; and, where a perforation exists, care must be taken that none of the solutions pass into the naso-pharynx and are swallowed; a plug of wool or gauze soaked in the solution in the deep meatus taking the place of the instillation. It is important to wring out the gauze thoroughly, whenever used, to dissolve out the irritating soluble cyanides. The method may seem severe and tedious, and it may be that other less irritating solutions will suffice; but, in whatever way performed, thorough purification will be found to repay one in the result obtained.

To take a few of the many advantages of thorough antiseptic principles in aural surgery—

Hæmatomata may be freely opened, and cleared out, preventing the deformity which results from non-interference.

Exostoses can be removed freely, without risk of setting up acute inflammation and suppuration, which sometimes has involved the middle ear with disastrous results; the formation of subsequent local excessive granulations, to which Mr. Field refers in a paper,[1] is not seen, the wound healing as rapidly as in other parts of the body. I have had the advantage of seeing a fair number of these cases in hospital under Professor Urban Pritchard, as well as in private practice, and have never seen excessive granulation tissue formation, although he tells me that he used to see it before he adopted thorough antiseptic methods. In all meatal operations subsequent antiseptic dressing is of course performed: a plug of gauze wrung out in 1 in 40 being introduced through the meatus to the site of the operation, and an external dressing and bandage being applied and changed as found necessary.

It is a common thing for patients to present themselves with all the signs and symptoms of acute suppurative middle-ear inflammation, and a history of *recent rupture of the membrane—due to either direct or indirect violence*—infection having occurred from the meatus and set up the middle-ear inflammation, which could have been prevented by immediate purification of the meatus and antiseptic dressing, the true surgical method of treating such an injury.

In *acute median otitis* the meatus should be purified and a light plug and dressing of cyanide gauze applied, whether the drum is to be incised or not, for it provides functional rest, a most important point, and one that is never properly insisted upon, thus doing good, even if rupture does not take place or an incision is unnecessary, the inflammation being arrested by the usual measures, which are not interfered with by the dressing; while, on the other hand, if rupture takes place, or an incision has to be made, further infection cannot take place; the dressing being gently removed and replaced as occasion demands. Every aural surgeon is familiar with the fact that often when an incision is made through a markedly bulging and inflamed drum, sero-sanguineous fluid alone escapes; now, if that fluid is allowed to run along an unpurified meatus, infection of some sort is nearly certain to occur, a purulent discharge with all its risks resulting. Cases of acute otitis should be treated, therefore, as an acute abscess is in any other part of the body. Again, when incising the drum to evacuate *mucus from the middle ear*, meatal infection can be prevented. Operations on the intact drum and ossicles, for relief of *chronic middle-ear deafness, or on the cicatricial results of middle-ear suppuration*, may be undertaken without the fear of "setting up suppuration." In *chronic middle-ear* suppuration, extremely good results are obtained by an initial thorough purification, and subsequent antiseptic dressing applied right down to the affected area.

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[1] "Aural Hyperostoses," *Lancet*, London, July 3, 1897.

The following case treated in this way by me in King's College Hospital will serve as a good illustration. I am indebted to Professor Pritchard for permission to publish it.

A girl, æt. 12, was in the hospital for some cardiac trouble; there was a thick, purulent, foul discharge from the left ear, which had existed for as long as the child could remember; the smell could be detected on approaching the bed. On examination, a small granulation could be seen in the neighbourhood of Shrapnell's membrane, and a perforation was present behind and below the malleus. Purification was performed with 1 in 20 carbolic, which caused no pain, the granulation coming away during the syringing; the meatus was lightly packed with the double cyanide gauze, well wrung out in 1 in 40, to dissolve out the irritating soluble cyanides. From that time purulent discharge absolutely ceased, being replaced by a slight, serous, non-offensive discharge, just moistening the dressing, which was changed at intervals of three days; on the eighth day the dressing was left out, as there appeared to be no discharge. A little serous discharge reappeared, but ceased absolutely under spirit instillation, the whole being healed in about fourteen days from the original purification.

If there is attic trouble, or caries of the ossicles or bony walls, the cases do not do so well, as operative interference is often necessary.

Granulation and polypi removed under this method give astonishingly good results. The affected ear should be syringed for a week or a fortnight with 1 in 40 or 20 by the patient himself, before the "great purification," and care should be taken to thoroughly remove the base of the polypi or granulation and to curette any carious spot; the dressing should be lightly packed right down to the affected area, subsequent dressings depending on pain, amount of discharge, and temperature. It will be found that dressing will not be required as frequently as one would expect; after the first dressing following the operation day, every second or third day will suffice; syringing will often not be found necessary, a little careful mopping with 1 in 40 in the deeper meatus being all that is necessary. The cases require careful watching, and if symptoms such as pain, temperature, free offensive discharge arise, the deep dressing should be removed, and frequent syringing, and dressing of the external opening only be resorted to.

It is needless to say that *cranial* and *intracranial* complication of chronic middle-ear suppuration can be attacked with freedom, and exploratory operation undertaken without fear.

These are a few illustrations of the benefits resulting from antiseptic methods in aural surgery; many more could be given to show that this branch of surgery has been revolutionised in the same way as every other.

THE TREATMENT OF SMALLPOX: PALLIATIVE AND PROPHYLACTIC.

By JOHN MOIR, L.R.C.P.Ed., *Leytonstone.*

FOR fourteen years ending in 1894, as medical superintendent of two smallpox hospitals, I have had about 4000 cases under observation and treatment, with an average mortality of 11 per cent.

I had previously seen a few cases of smallpox in Edinburgh and Manchester in 1864–66, and a considerable number in Bristol in 1874–75, but not in hospital practice, so that I shall confine my remarks to my hospital experience, so far as the palliative treatment goes.

Of course there are many degrees of severity in the different varieties of the disease. In the simple or discrete variety, no treatment is practically required, whilst in the completely hæmorrhagic variety no treatment is of any avail; but the semi-confluent, confluent, and semi-hæmorrhagic forms are amenable to treatment of the most persevering kind. The complications and sequelæ—especially threatened blindness, laryngitis, pneumonia, abscesses, bedsores, etc.—require the most active treatment.

Sydenham was the first to insist on the benefit of lofty and spacious, thoroughly well-ventilated accommodation, with perfect cleanliness. Guersant and Blache[1] also particularly dwell upon this. The Local Government Board and Metropolitan Asylums Board compel this requirement to the full in all hospitals under their control; and I found in severe epidemic times, without sufficient provision for this ample air space, at least 1500 cubic ft. for each bed (and there ought to be as much more as possible), that overcrowding exactly doubled the mortality, erysipelas and other febrile states supervening; and the mortality always increased in ratio to the number of patients in excess of the proper number, even when it could hardly be said to amount to overcrowding. Dr. J. H. Bridges, ex-inspector to the Local Government Board Poor Law Department, was particularly insistent upon this point, and rightly so. As soon as there is no overcrowding, the mortality at once goes down. With the present facilities for rapidly providing temporary iron hospitals, there is now no excuse for overcrowding in the treatment of infectious diseases.

In the early stages of smallpox the palliative remedies required and of most use in treatment are sudorifics—Dover's powder, liq. ammon. acet., and the like—with an aperient, black draught in preference, as acting on the whole line of the intestinal canal. Soups, beef-tea, milk, and cooling drinks (citric acid diluted and flavoured with sugar and orange, or lemon syrup), and oxalic acid used in a similar manner. With respect to the oxalic acid drink as a refrigerant,—recommended with the formula for making it in Scoresby Jackson's "Materia Medica,"—my patients, even at the worst, when their eyes were closed from the swelling of the lids, used to ask for the "cooling" drink, as they found that it relieved the thirst better than anything except ice. Sir Robert Christison wrote me the following letter on the subject, the advice in which I afterwards put in practice with very good results:—

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[1] *New Syd. Soc. Translation.*

"40 MORAY PLACE, EDINBURGH,
"*16th April* 1880.

"DEAR SIR,—I know no reason whatever why oxalic acid should not be used medicinally in small doses, as well as any of our other formidable poisons. Its physiological action in large doses does indeed indicate it as available in small doses in disease. You are probably aware that it was in use many years ago in France for making acidulous drinks; and also that, in the form of binoxalate of potash, it was in use on the Continent for the same purpose as obtained from sorrel. I suppose it had been lost sight of, in consequence of its great energy and swiftness of action in large doses as a poison. The same fate has befallen tartar emetic, in consequence of its use as a secret poison by Palmer and Pritchard. The prejudice in both instances is unreasonable and injurious. Of course, in using it, care must be taken against too large doses or too great concentration of small ones.—I am, yours sincerely, R. CHRISTISON."

I have already incidentally mentioned ice, which is invaluable in milk, cooling drinks, water, or by itself. Then oranges and ripe fruit (especially apples), mineral waters, tea, cocoa, etc., with milk puddings, eggs, roast mutton, fowls, and so on, up to full diet.

There is no good to be obtained by puncturing ripe pustules, or using masks of collodion and castor-oil, iodine diluted, or nitrate of silver, or anything of that kind; but it is much better, and always gives better results, to allow as much freedom from tension of the skin in exposed parts as possible, by using freely and lavishly, and very frequently, the best olive-oil, vaselin, or Sanitas ointment, the last being particularly grateful to the patient, and the odour by no means unpleasant. This requires great patience and perseverance on the part of the nurse, as well as the daily attention to the head, and particularly the hair; indeed, in this respect one cannot be too careful, as, with even the very greatest care, cleanliness cannot after all be entirely or absolutely ensured.

With regard to the eyes, and the danger of blindness from pustules forming, and from ulcers, as well as inflammation, photophobia, and the like, frequent bathing, sponging, and syringing is necessary; and sometimes the extract of belladonna made into a paste, and applied on the inner eyelids with a camel's-hair brush, will prevent the loss of sight; and occasionally perhaps the application of a solution of nitrate of silver. But no hard-and-fast line can be laid down for such cases as these; each must be treated as it arises, and for each must be used the appropriate remedy. Even then, unfortunately, a small percentage barely escape with life, but lose the sight of one, and less often of both eyes.

For sleep, Dover's powder, tr. op. c̄ glycerin, or, more often, chlorodyne and glycerin, are useful; sometimes hyosc. or cannab. ind. are useful in a sleeping mixture; the hyoscyamus being preferable for children, with sweet spirits of nitre and syrup of squills.

All abscesses ought to be opened, and linseed meal and charcoal poultices applied, particularly to bedsores; then benzoated zinc ointment, thickly spread on medicated lint, and frequently changed. Empl. roborans strappings (1 in. in breadth), applied not too tightly, and changed daily, frequently facilitate the healing of tedious abscess or ulceration sores, after the cleansing and healing process has once made a start.

I have had no recoveries from hæmorrhagic smallpox, but in semi-hæmorrhagic—that is, eyes bloodshot, bleeding from bowels, and a few purpuric spots here and there about the body—cases have recovered, with the treatment internally by tr. fer. perchlor. c̄ ac. sulph. dil. et liq. chlorof.

In laryngitis, a common and dangerous complication, the most useful remedies were found to be steel and quinine, chlorate of potash and glycerin, syr. limon. vel syr. aurant. c̄ ac. citric et syr. simpl., internally; and the local application of liq. fer. perchlor. and glycerin in equal parts, with small pieces of ice given, to be sucked away in the mouth, and a warm linseed meal poultice applied in a flannel to the throat externally.

In pneumonia and bronchitis and other complications, the remedies used were simply those for the maladies occurring in uncomplicated states, and were usually successful, though one or two deaths occurred from pneumonia, as doubtless they might have done under ordinary circumstances.

In May 1884, I had two women suffering from hæmorrhagic smallpox, who were confined in hospital, each with a dead child, the mothers dying two days afterwards. On August 13, 1884, three days after admission, I attended Mrs. Caroline Heath in her confinement of a male child, James Heath, who did not take smallpox, and was discharged well with his mother on the following September 10. In another case the patient, admitted also in August 1884, died of peritonitis seven days after admission. On November 5, 1884, Mrs. Minnie Beaver was admitted, suffering from discrete smallpox, was confined with a male child, Joseph, on the 7th, who had jaundice for seven days, November 10 to 17, and was discharged well along with his mother on December 17, 1884. We had seamen off ships, foreigners, negroes, and a good many gipsies admitted from time to time; the latter, invariably unvaccinated, mostly died.

In convalescence, daily warm baths, as soon as the patient was strong enough and the pustules began to scab, were resorted to; but sometimes, in mild cases, baths were used from the first, patients not confined to bed, nor compelled to remain indoors, if able to go out safely into the grounds; in fact, there was no routine treatment, and I do not think there ought to be; every case should be treated or not treated according to its necessities. After the first bath, in severe cases, usually more solid food was allowed—mutton, fish, beef (boiled, stewed, or roast), with light pudding and fruit. It was not at any time found either useful or necessary to give any wine, beer, or spirits, although there was no restriction, and they would have been used if required. All abscesses were opened, dressed, and kept clean, and such patients were, for hygienic purposes, allowed to sit out, when able, in the open air, talk, sing, read a little, or walk about just as they pleased. They went to bed at nine in summer, eight in winter, but could go and lie down in or on their beds at any time in the day and for any length of time.

Friends were allowed to send in messages at the gate three times a week; also fruit, jelly, jam, or sweets, at the discretion of the matron, nurse in charge, or doctor. A clergyman visited all the patients once a week, held a service for convalescents (attendance not compulsory), and came besides, whenever sent for, either night or day. Books, papers, magazines, and flowers were plentifully supplied and warmly welcomed; the late Mr. A. Locker, editor of the *Graphic*, being one of the patients' kindest friends in this way. These were all aids to recovery, and I think enough has been now said on the palliative treatment of smallpox; after all, only hygienic and for the most part common-sense treatment, with special treatment only for cases requiring it.

We now come to the second part of our subject—the prophylactic treatment of smallpox. The prophylactic treatment of smallpox, as pointed out some years ago by Sir Henry D. Littlejohn in the *Edinburgh Medical Journal*, may be summed up in three words—(1) Disinfection, (2) isolation, (3) vaccination.

1. *Disinfection.*—The plentiful use of the ordinary disinfectants in the house from which a smallpox patient has been removed, including the disinfection of bedding, clothing, etc., is usually sufficient to prevent the spread of the disease to other inmates of the house or to the neighbours. After that, before the room or rooms are again used, the chief disinfectant is fresh air—windows thrown wide open, and efficient ventilation maintained at all hazards. Then, in the hospital itself, fresh air is the chief and best disinfectant. The windows should be nearly always open, with plenty of efficient ventilators besides; and in winter good fires and hot-water pipes should be relied on to keep up the

temperature, without the air becoming poisonous owing to the exhalations, scabs, etc., being retained in the atmosphere through the windows being closed. There is no doubt that efficient disinfection is the first step in the prevention of the spread of smallpox.

2. If this is so, no less is it true that the second step is *Isolation*, and the isolation, to be of any use, must be thorough. While smallpox hospitals were maintained in crowded thoroughfares in London — such as Homerton, West Ham, and Deptford — the disease varied, but did not disappear. Since the cases have been removed to the hospital-ship down at Long Reach, the cases have got fewer and fewer year by year, until now, in 1897, there is not a single case of smallpox amongst all the millions of London's inhabitants. The case of Leicester has long pointed out the same lesson, plain and undeniable, the vast benefit to be derived in these cases from disinfection and isolation.

But whilst admitting to the full, without detraction or diminution, the benefits derived from these two sources, disinfection and isolation, the experience of the present century, and the experience particularly of the Victorian era, proves beyond a doubt that disinfection and isolation by themselves are not sufficiently reliable without the third and chief factor in the prophylaxis—that is, vaccination.

Dr. Tripe, Mr. Power, and others have proved that smallpox is carried in the air, and is extremely infective for a zone of at least a quarter mile, and in lesser degree for a zone of quite half a mile; and also in summer, I have reason to believe, by flies and bluebottles and suchlike unavoidable visitors, besides people in hospital waiting-rooms, shops, beer shops, public-houses, etc., vitiating and minimising the benefits of isolation. We want, then, isolation plus vaccination. And here we are on sure ground.

3. In England, and in some States of America, vaccination is compulsory; but in America, as in England, we find some outcry against it, chiefly because it is compulsory (although also on health grounds), and because compulsory, against the so-called spirit of the age. Dr. Foster, of Georgia, U.S.A., says: "The time has not yet arrived, and in democratic America, where the cry of the infringement of personal liberty is the shibboleth of the demagogue, the day may never come, when it would be wise to resort to compulsory vaccination." To meet this, he suggests that "it should be regarded as a special and solemn duty upon the part of municipal authorities to annually provide gratuitous vaccination for the indigent poor." I confess to the belief that "a benevolent despotism" is the last word that must be said, and that it is the manifest duty of the State to protect people against others, and in this case, in many instances, against themselves. Singularly enough, in this connection, even Dr. Eugene Foster proposes that every immigrant should be required to exhibit proof of *successful* vaccination before being allowed to land in the country.

In Austria, Holland, and some of the Swiss Cantons, vaccination is not compulsory, but education is compulsory, and every child must bring a certificate of successful vaccination before being allowed to enter school, the penalty being fine or imprisonment of parent or guardian for child not attending on arriving at school age.

In Hungary, Roumania, Servia, and Sweden, vaccination is compulsory. In Portugal, my brother-in-law, who has lived in Lisbon for thirty years, informs me that vaccination is not compulsory, but the State has provided a fully equipped vaccine institution in Lisbon, and every facility for vaccination is provided throughout the country. The practice in Spain can be seen from the following extract of a letter I received from the late Dr. William Jelly, physician to the Queen of Spain, who says: "You can affirm on my authority that there are no compulsory laws in reference to vaccination, either in the Spanish army or out of it. Every child, sooner or later, is taken to be vaccinated—that is to say, the whole Spanish nation is vaccinated, but numbers are not re-vaccinated, simply from carelessness or neglect, consequently there is now and again smallpox here and there. I am pained to find that any British subject should show less common sense, not to say perversity, than the wretched and ignorant Spaniards, who make it a specific duty to be vaccinated voluntarily, so that you may travel into the smallest towns and hamlets, as well as the great cities, and find every one with excellent vaccine scars.—Yours faithfully, William Jelly."

In Japan, the Great Britain of the Far East, vaccination has been compulsory since 1874. Also in Finland and in Denmark. In Norway there is no penal clause for non-vaccination, but no one can be confirmed or married without being vaccinated.

In Russia it is compulsory in the army and educational establishments. In Belgium it is practically compulsory. There are daily vaccinations and re-vaccinations in Brussels, and it is frequent everywhere else. Defaulters get no public assistance, and, being deprived of all assistance, they are practically submissive. In Italy it is the same; but Dr. Ricchetti of Venice says that "every scholar, collegian, naval, military, or civil employé must be vaccinated, and after a time re-vaccinated. In Germany and in most of the Swiss Cantons it is compulsory.

I find also, from the "Dictionnaire encyclopédique des sciences médicalés," Paris, that in France vaccination is now compulsory.

In Greece vaccination and re-vaccination is compulsory on all the inhabitants of a locality in which there is a case of smallpox.

As to Turkey, I have no information; but in India, as in England before inoculation and vaccination, one person in nine dies of smallpox; and "no Hindoo father will make a will leaving property to his eldest son until that son has first had smallpox."[1]

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[1] Dr. Robert Hunter, Editor, "Cassells' Encyclop. Dict."

For twenty years I have noticed in all the great London docks the large number of Lascars, Sidi-boys, and others from the East who are marked, generally very severely marked, with smallpox. Blindness, however, is not so common among the natives in India now, and vaccination is more frequently practised, especially since the advent among them of lady doctors.

Typhus and the black plague have practically disappeared with increased sanitary knowledge, and the recent discoveries concerning diphtheria and yellow fever lead one to hope that if proof were wanted as to the value of Jenner's great discovery of vaccination as the prophylactic in smallpox, it will soon be verified in other fields of zymotic diseases.

Here I would suggest that instead of the hypodermic injection only in cases of diphtheria, three modes should be adopted:—(1) In mild cases, the antitoxin might be administered in the form of coated pills, capsules, dragées, lozenges, or tabloids; (2) in severe cases, by hypodermic injections, as at present; and (3) in cases apparently *in extremis*, as suggested by Dr. C. J. Martin,[1] Victoria, Australia, as in transfusion, directly into the circulation, instead of under the skin, thereby saving perhaps twenty-four hours.

From Mr. Cheesewright's photographs, which he has shown me of Dr. Morgan Dockrell's cases of lupus treated by Dr. Koch's treatment in St. John's Hospital for Skin Diseases, Leicester Square, one can see that a great improvement has taken place, and one of the most hopeless diseases has been brought within the reach of successful treatment. Dr. Margaret Pearce, also in the Canning Town Medical Mission Hospital, London, E., has published a very successful case in the *Lancet*, July 10, 1897, of the treatment of ulcerative endocarditis with antistreptococcic serum, and the thyroid experiments with others in the same direction show the trend of modern successful medical treatment to be on the same lines with the original discovery of Dr. Edward Jenner.

In 1884, when Sir Charles Dilke was President of the Local Government Board, I made some private inquiries for Sir George Buchanan, then medical officer to the Board, as to the practice of vaccination in foreign countries, and the respective values of humanised and of calf lymph.

Dr. Drysdale, Count Warlomont, and others preferred calf lymph; Dr. Buchanan preferred humanised lymph, and said that "from all he himself knew or could learn from others it had undergone no deterioration whatever, and was, if the operation were properly performed, not only as efficient, but as innocuous as ever." I believe, as the opinion of the greatest expert on the subject of his day, that this still holds true, but it is of less importance now, because, to give honest, *bonâ-fide* objectors no ground of complaint, the Government now provides both humanised and calf lymph. I have a preference myself for the latter, but Dr. Eugene Foster, of Georgia, like Sir George Buchanan, prefers humanised to animal lymph; and Dr. Samuel W. Abbott, of Wakefield, Massachusetts, in discussing animal versus humanised lymph, lays down two "conditions of perfection." First, the vaccination should be from arm to arm, or direct from calf to arm —that is, the lymph should always and in every instance be fresh; and second, the subjects selected for such transmission should be in a condition of perfect health, and should never have been vaccinated before.

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[1] *Lancet*, London, Nov. 13, 1897, p. 1292.

It only remains for me to state that the amount of protection afforded is in exact ratio to the amount of successful vaccination. Four well-marked foveated cicatrices are necessary to produce a successful vaccination and immunity from a severe attack of smallpox, and revaccination has in my experience been entirely successful in preventing death from smallpox, and might well be practised at an earlier age than is now provided for by Government in epidemic seasons. With the prophylactic treatment of smallpox by vaccination, diphtheria by antitoxin, yellow fever by its antidote, going forward successfully, it is not too much to hope that scarlet fever and cholera will before long become amenable to similar treatment with equally favourable results.

I ought to say that the plan of mixing lymph, humanised or animal, with glycerin, for keeping for a long time, or in hot countries, now practised for Messrs. Burgoyne & Co. by Mr. Wm. Faulkner, M.R.C.S., British Calf Vaccine Institution, was first made years ago successfully by an Edinburgh graduate, Dr. Lachlan Aitken, then of Rome, and published in the pages of this Journal.

INTUBATION OF THE LARYNX.

By KILLICK MILLARD, M.D., B.Sc.,
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THE operation of intubation of the larynx has scarcely received from the medical profession in this country the consideration which its merits justly deserve. There are undoubtedly many cases of laryngeal obstruction which are allowed to die without any attempt at operative interference, because tracheotomy is not considered under the circumstances to be practicable, and the alternative operation of intubation is not sufficiently known.

It is in this fact that I find justification for the following paper:—

Briefly, the *history* of the operation is as follows:—The passing of a tube, as for instance a catheter, through the glottis, in order to admit air in cases of laryngeal obstruction, is of ancient date, but it was not until 1858 that Bouchut, in Paris, first devised special instruments for the purpose. Owing to their defective construction, however, and to the opposition of that great authority, Trousseau, their use met with but little favour, and was soon abandoned. In 1881, twenty-three years later, the subject was taken up by Joseph O'Dwyer, in the United States, who devised the greatly improved instruments now known by his name. From that time up to the present the operation has gradually been growing in favour, only slowly in this country, but much more rapidly on the Continent, where in many places it has entirely superseded tracheotomy as the primary operative measure in cases of laryngeal obstruction. This is the case in Paris, where, at the two principal hospitals for diphtheria, Hôpital des Enfants Malades and Hôpital Trousseau, the writer has had the opportunity of specially studying the operation. The instruments in use at these hospitals differ from O'Dwyer's pattern in some important particulars. The tubes themselves are shorter, and therefore easier of introduction, and less likely to become obstructed; the pilots are attached to the introducer by a simple catch arrangement instead of a screw, and the tubes are detached from the pilots by a different and more convenient mechanism. They are made by Collin of Paris, and are beautifully finished. The price is £6, 6s. per set.

Technique of the operation.—The child to be intubated should be wrapped up in a blanket in such a manner that the arms are fixed to the side, and will not require further attention. Two assistants are desirable, but it is easy to perform the operation with only one. Any intelligent woman should be capable of acting as assistant, but naturally a trained nurse is preferable. Assuming that there are two assistants, the duty of the first is to take the child, wrapped up as described, upon her right knee, gripping its legs with her own and supporting its body with her arms. The duty of the second is to hold the head perfectly steady and strictly in the middle line. The operator seats himself on a low chair exactly facing the patient, or it may be found more convenient to kneel. The instruments will have been set out ready on the operator's right hand. There is none of the preliminary preparation so important in a tracheotomy. The case of intubation instruments is complete in itself, and assuming that they have been sterilised since they were last used, and the tubes kept ready threaded as they should be, the instruments require no further preparation. These, with some absorbent wool and a swab-holder for swabbing out the throat, are all that are required. Even the swab-holder can be dispensed with, as some wool wrapped round the finger answers quite well. The use of a lubricant is unnecessary, and for the fingers objectionable, as it impairs the sense of touch, which for this operation is all-important. Whilst the nurse is wrapping the child in the blanket, the operator selects a tube corresponding to the age of the patient, and attaches it with its pilot to the introducer, after threading it with a convenient length of silk thread, if this has not been done before. Ordinary ligature silk may he used, or the embroidery silk known as "flannel" silk will be found to answer very well. The object of this thread, the "safety thread" as it is called, is to recover the tube if by chance it be passed into the œsophagus instead of into the larynx, an accident which very easily happens. The most important quality in the silk is that it should draw out easily when it comes to be removed.

We now come to the performance of the actual operation itself. For the purpose of description, this may be divided into three distinct steps—(1) The introduction of the gag; (2) recognition of the landmarks; (3) introduction of the tube.

1. *Introduction of the gag.*—The gag is fixed in position between the left molars, and opened as widely as possible. Once properly in position, it should require no further attention, and it it much better for the assistants not to touch it.

2. *Recognition of the landmarks.*—Holding the introducer in the right hand, with the fourth finger through the safety thread to keep it out of the way, the operator now introduces the left index finger into the mouth. After passing through the fauces, the first landmark is the epiglottis. In very young children it is not always easy to feel this, owing to the softness of the tissues. It sometimes gives trouble from getting pushed down in front of the finger, and it must then be hooked up. Immediately below the epiglottis is the entrance to the glottis, bounded below by the two arytenoid cartilages. These constitute the second landmark, and it is most important for the successful performance of the operation that they should be clearly recognised. To do this it may be necessary to pass the finger down to its utmost extent, as otherwise the arytenoids may be out of reach.

3. We now come to the third step, the *introduction of the tube.* Once the arytenoids are felt with the tip of the finger, the opening of the glottis must lie immediately in front of the pulp of the finger. Keeping the finger then in position, but not pressing too firmly, in order to allow, if possible, some air still to enter, the introducer with tube attached is slipped quickly into the mouth, passed along the palmar surface of the finger, over the dorsum of the tongue, over the epiglottis (care being taken not to get behind the latter into the cul-de-sacs on either side), till the ball of the index finger is reached. The handle of the introducer is then slightly raised so as to direct the point of the tube into the glottis, and the tube passed on till the collar on the tube is felt. The mechanism for releasing the tube is then put in action with the right thumb, and the introducer withdrawn, the tube being kept in position meanwhile with the index finger over the glottis.

In performing this third step of the operation, it is very important to work strictly in the middle line.

Once the tube is in position, a marked change comes over the respiration, which enables it to be told whether the tube is really in the larynx or not. The most reliable indication of its being in place is that the breathing at once becomes absolutely aphonic. However "croupy" the child may have been before operating, there is nearly always some slight power of phonation still remaining; hence this is a sign of great value. In addition, the child usually, though not always, begins to cough, and brings up more or less of accumulated secretion. On the other hand, should the tube be in the œsophagus, no change is observed in the respiration, and the tube usually commences to slowly travel downwards, as evidenced by the shortening of the safety thread, when it must be at once withdrawn.

Being satisfied that the tube is really in position, the gag is removed, and the child put back to bed. If the patient should not be coughing, and is not breathing well, it is a good plan to give it a few teaspoonfuls of milk, with the view of inducing cough, in order to help to clear the air passages of accumulated secretion, false membrane, etc.

The next step is to consider whether or not to remove the safety thread. In Paris it is usual to remove this at once before putting the patient back to bed. If it is not removed it is apt to prove a great source of irritation, and very probably is soon bitten through. Moreover, it has been alleged as a cause of secondary pneumonia, and whether this is so or not there is very little really to be gained by leaving it in. Perhaps the best course is to leave it for a few hours. It should be looped over the auricle, and secured there with sticking-plaster. To remove it the gag is re-introduced, the thread cut through, and gentle traction made upon it, the tube being retained in position meanwhile by the finger in the throat.

The actual operation of intubation, if neatly performed, ought not to occupy more than fifteen seconds. If the operator fails to pass the tube in at once, the finger and introducer should be withdrawn to give the patient time to breathe before making a second attempt.

The relief afforded by the operation is immediate and most striking. The patient quickly falls asleep, sometimes within a few minutes. The frequency of respiration diminishes, cyanosis disappears, and recession of the ribs is gone.

In cases where there is much secretion the operation may have to be interrupted in order to swab out the throat.

The after-treatment is comparatively simple. For a day or two there is more or less cough, but only occasionally, and then chiefly because the thread has been left in, is this really distressing. In some cases there is no cough at all. If the thread has been left in, a special nurse is necessary to watch that the patient does not interfere with it. After the thread has been removed a special nurse is not essential. Swallowing often gives rise to a little trouble at first, in consequence of the coughing it produces. The patient should be taught to drink lying back in a slightly recumbent posture, and to take big gulps rather than little sips.

Possible accidents and complications.—If the tube selected should be too small, the probable result will be that it is not retained, but is at once coughed up. If this happens it is necessary to replace it by a larger one. The collar on the tube is sufficient protection from any risk of the tube dropping down into the trachea. The passage of the tube into the œsophagus is of little importance, and has already been referred to. Vomiting may occasionally occur during the operation, but is rarer than would have been expected. Slight hæmorrhage may occur from the congested faucial mucous membrane, but depends upon the skill with which the operation is performed. It should be emphasised that no force is necessary. Another possible but rare accident which may happen where the operation is performed for diphtheria, is pushing back of false membrane in front of the tube as the latter enters the larynx, causing immediate and complete obstruction. This possible accident has been urged as a strong reason against intubation, but apparently it is more theoretical than real. Bokai records eighteen cases necessitating immediate tracheotomy out of 498 intubations, but O'Dwyer states that he never had a single death from it out of 600 cases. It is, however, evidently desirable, when practicable, to have tracheotomy instruments in readiness in performing the operation. Blocking of the tube after it has been some little time *in situ* is an accident which *a priori* one would have expected to have been of constant occurrence, bearing in mind how apt it is to happen in the case of a tracheotomy tube. As a matter of fact, it very rarely occurs, and the explanation probably lies in the fact that the tube is straight instead of being bent. It is surprising what large masses of false membrane can be coughed up through an intubation tube. Bokai has photographed a piece of membrane thus coughed up, which formed a complete cast of the trachea and bronchi. In cases where the tube does, nevertheless, become blocked, the probable result is that the tube and obstruction are coughed out together. It has happened that the tube thus coughed up has afterwards been swallowed. No bad effects result, however, and the tube is passed per rectum a few days later. Broncho-pneumonia, the bugbear of tracheotomy, does occur also after intubation, but is much rarer. Slight ulceration of the larynx may occasionally occur, and is a reason for not leaving the tube in longer than is necessary. A tube may, however, in some cases remain *in situ* for months at a time without causing any bad effects.

Extraction of the tube.—If this is to be performed with the extractor, the operation resembles the operation of inserting the tube, as far as the first two stages of that operation go. The extractor is then introduced, the point guided with the tip of the index finger into the opening of the tube, the beaks separated, and the tube withdrawn. The operation of detubation, or extraction of the tube, thus performed, is a much more difficult one than that of intubation, or insertion of the tube. There is, however, a very simple and most effective method of removing the tube, which requires the use of no instruments, and which was discovered in Paris by one of the house surgeons at the Hôpital des Enfants Malades. This is the method by expression. It is performed thus:—The nurse takes the child upon her knee. The operator faces the child, and with his left hand over the vertex places the right thumb upon the trachea, grasping the neck with his fingers. He then simultaneously compresses the trachea backwards and upwards, and jerks the child's head downwards into the nurse's lap, when in the majority of cases the tube drops out without further trouble. This method, besides being simple and effective, causes no inconvenience at all to the child, and it should certainly be adopted in preference to using the extractor.

When to remove the tube.—This should be done on the second or third day if the temperature and rate of respiration have commenced to fall. In any case, the tube should be removed, as a rule, at the end of five days. The removal must always be regarded as a tentative measure only, and in many cases it will be found necessary to replace it, sometimes immediately.

Indications and contra-indications.—Speaking generally, these are the same as for tracheotomy, namely, whenever there is mechanical obstruction to air entering the glottis sufficiently great to threaten death by asphyxia. The symptoms of this are dyspnœa, "croupy" breathing, "recession" of the intercostal spaces, and sucking in of the lower costal margins, great restlessness, and commencing cyanosis. If there is the slightest reason to think that the case may be diphtheritic, antitoxin should be at once given, and in large doses; and if the symptoms are not very urgent, and the case can be watched, operative interference should be postponed till the effect of the serum has been shown. There is not the same reason for waiting, however, as there is in the case of tracheotomy, as the operation itself is almost free from risk. Moreover, once the symptoms have become urgent, any delay is highly prejudicial to the ultimate hope of recovery. The child quickly becomes exhausted, and subsequent pneumonia rendered more probable.

Comparison between intubation and tracheotomy.—There are many cases where there is no need to weigh the relative merits of the two operations, for intubation may often be feasible when tracheotomy is out of the question. Few men in general practice would care to undertake the latter operation in a small, badly-lighted cottage without proper qualified assistance and some preparation. Indeed, in poor-class practice, where an hospital is not available, the operation is rarely, if ever, performed. The nature and difficulties surrounding the operation easily account for this, but none the less is it the case that operative interference is indicated, and lives are lost for the want of it. It is for such cases as these that it is so desirable that the merits of intubation should be better appreciated.

It is necessary, however, to face the question, whether intubation is not really to be preferred in all cases, and therefore it is desirable that we should consider what are its advantages and disadvantages as compared with tracheotomy.

Its advantages are—

1. The operation is simple, once the knack of performing it is acquired.

2. It requires none of the ordinary essentials for an operation, much less the many special requirements essential for tracheotomy.

3. It is much more rapidly performed, requiring practically no preparation, whilst the actual operation should only occupy from fifteen to twenty seconds. It is therefore *the* operation for an emergency.

4. It does not require an anæsthetic. A very great advantage.

5. It requires much less assistance, two or even one intelligent woman being all that is necessary.

6. It does not require a good light. It can be performed almost as well in the dark.

7. As an operation, it is attended with much fewer risks than tracheotomy. Secondary pneumonia is comparatively rare.

8. Less after-treatment is required.

9. Though unable to talk whilst the tube remains in, the patient can readily make himself understood in whispers.

10. There is no wound to heal up after removal of the tube. Convalescence is therefore more rapid.

11. There is no disfiguring cicatrix, nor fear of subsequent stricture of the larynx.

12. There being no cutting and consequent hæmorrhage, little difficulty is experienced in obtaining the consent of the friends.

Its disadvantages are—

1. Some difficulty in performing the operation until the requisite knack of doing it is acquired. This is probably one reason why the operation has not come more rapidly into use. The novice not infrequently fails to get the tube into position.

2. The possibility of pushing back of false membrane as the tube enters the larynx. As already shown, this is an accident which only rarely occurs.

3. The possibility of the tube becoming blocked whilst *in situ*, necessitating immediate detubation. This also is of very rare

occurrence, as usually, if the tube does become blocked, it is coughed out.

Provision against this accident can be made by instructing the nurse, if an intelligent woman, how to detubate in an emergency by the method of expression.

Résumé of cases at the City Hospital, Birmingham.—Coming now to the writer's own experience, this has as yet been too small to be of much value. Altogether he has had ten cases. Of these, one was in an infant a year old, dying from broncho-pneumonia, in which the operation was performed fifteen minutes before death, in the hopes of giving some relief. This case may fairly be excluded. The remaining nine were in cases of obstructive laryngitis occurring during convalescence from scarlet fever. Five recovered and four died. First, a word as to the nature of this condition. Clinically, they may be described as "croup"; pathologically, they may be due to an inflammation of the larynx, either primary or secondary to an angina, or they may be due to œdema of the glottis. Lastly, they may really be diphtheritic, the membrane being confined to the larynx. In the following cases, however, none of the cases examined showed evidence of Löffler's bacilli, and the writer does not regard any of them as being diphtheritic. Whatever the cause may be, the condition following scarlet fever is undoubtedly very fatal, and a source of the greatest anxiety to those in charge. The routine treatment, other than operative, carried out at the Birmingham City Hospital, consists in placing the child in a steam chamber or tent, applying hot fomentations to the neck, and the free administration of antimony and ipecacuanha. Not until the case becomes grave, as indicated by great distress, evident exhaustion, or commencing cyanosis, is operative interference resorted to. The experience of tracheotomy in this class of case at this hospital has been such, that the writer is satisfied that the results in the following cases are better than would have been obtained had that operation been practised:—

Case 1.—Ethel W., æt. 4; admitted with anginous scarlet fever; developed nephritis in fourth week, lobar pneumonia in fifth week. In eighth week, her temperature having then been normal for seven days, and her chest clearing up, temperature again went up slightly, and she developed a croupy cough. By 5 A.M. the following morning she had become much worse; there was marked stridor, aphonic voice, and hoarse, croupy cough. There was no sign of membrane in the throat, but, on the chance of the case being diphtheritic, a dose of antitoxin was given. Subsequent bacteriological examination, however, failed to reveal any bacilli. Patient was also placed in a steam tent. By six o'clock condition had become still worse; child very restless and tossing about; stridor increasing, and marked recession of the ribs; commencing cyanosis; oxygen administered for twenty minutes, but without apparent effect. Preparations then commenced for tracheotomy, but in the meantime intubation was performed, and gave immediate relief. The effect, indeed, was magical, and within five minutes the child was fast asleep. She rapidly improved, and at end of thirty-six hours the tube was removed. Six hours later the stridor and recession had increased so much that the tube had to be replaced. It was then left undisturbed for seven days, and then removed. There was no recurrence of the unfavourable symptoms, and a fortnight later she was out of bed, and her voice had returned.

CASE 2.—Elsie B., æt. 4; admitted with simple scarlet fever; developed nephritis in fourth week; had an exacerbation of this in twelfth week. In thirteenth was found one evening to have a husky voice, somewhat stridulous breathing, and slight recession of the ribs. She was put on vin. antimoniale, and hot fomentations ordered to the neck. At 2.30 A.M. the following morning she had become much worse. Stridor was then audible all over the ward. Patient very restless, tossing about, and lips slightly livid. There was marked recession of the ribs, and patient appeared to be getting weaker. Intubation performed, and gave immediate relief. Patient sleeping quietly fifteen minutes later. The tube was removed on the third day, and was not again required.

CASE 3.—Arthur P., also æt. 4; admitted with anginous scarlet fever. Had rhinorrhœa, adenitis, and ulceration of tonsils, but no nephritis. Was apparently convalescent in third week, when he developed a croupy cough, aphonia, and slight pyrexia. Was put on vin. antimoniale, but had become worse by evening. At 4.40 A.M. the following morning he was much worse still. Patient very restless and fretful, respiration rapid and laboured, marked recession of the ribs, face cyanosed. Intubation performed, and a quantity of mucus coughed up immediately afterwards. Patient much relieved, and asleep in five minutes, but colour remained bad for half an hour. Patient had no trouble at all in swallowing afterwards. Tube removed on fourth day, and not again required.

CASE 4.—Laura S., æt. 1½; admitted with simple scarlet fever; developed croupy cough at end of third week. Was put on antimony, and placed in steam tent, and next day breathing was normal. Two days later the condition recurred, and this time rapidly became worse, so that intubation became necessary. Tube was removed the following day, and was not again required.

CASE 5.—May D., æt. 3; admitted with simple scarlet fever. This case was similar to the last. Tube remained in three days, and voice began to return two days after its removal.

The following are the four fatal cases:—

CASE 6.—Harry B., æt. 2; admitted with anginous scarlet fever; developed otorrhœa and rhinorrhœa. Symptoms of laryngeal obstruction in fifth week. Intubation performed, but pneumonia rapidly set in, and child died on third day.

CASE 7.—Edward B., æt. 2; anginous scarlet fever, with adenitis and profuse purulent rhinorrhœa. Symptoms of laryngeal obstruction at end of third week. Intubation performed, but operation rendered somewhat difficult by greatly enlarged tonsils, which met in the middle line. Tube removed on second day, but had to be at once replaced. Three days later it was again removed, but again had to be replaced. pulmonary symptoms now developed, and patient died from pneumonia three days later, the eighth day after intubating. Tube was left in till after death, as patient was breathing easily though rapidly. Post-mortem there was found to be consolidation of both lungs, marked congestion of the tracheal mucous membrane, but not in the larynx, nor was there any ulceration in the latter.

Case 8.—David H., æt. 4; simple scarlet fever. Developed acute nephritis in third week, with almost simultaneous occurrence of severe laryngeal obstruction, probably due to œdema of the glottis. Intubation performed, and tube removed the following day. Ten minutes later, however, alarming symptoms of obstruction set in, presumably due to spasm. Reintubation was at once attempted, but for some reason, presumably the spasm, the tube could not be got into position. The patient's condition became so rapidly worse that tracheotomy had to be performed. The child, however, died on the table. In view of the possibility of such a contingency as inability to reintroduce the tube after detubating, should spasm occur, it is obviously desirable to have tracheotomy instruments in readiness in all cases, even though the need for them may very rarely arise.

Case 10.—This case was also fatal, but the records of it having unfortunately been lost, it cannot be referred to further.

Conclusion.—In intubation we have a very valuable operation for the relief of laryngeal obstruction. It has many advantages over tracheotomy, and is often feasible when tracheotomy is impracticable. In the writer's opinion it is the preferable operation in all cases of obstruction, at least in the first instance. It stands in much the same relationship to tracheotomy as catheterisation does to tapping the bladder. The more severe operation should not be practised until the lesser has been attempted and found insufficient or impossible.

ALCOHOLIC DILATATION OF THE HEART.

By Fred. Tresilian, M.D., M.R.C.P.Ed., *Clinical Assistant, Central London Throat and Ear Hospital.*

The heart is one of the several organs in the body which alcohol has a marked proclivity to attack. Chronic alcoholism shows itself in many distinct phases, and at different stages in the duration of the toxic effect differing manifestations may be apparent. The alcoholic habit is indulged in more steadily, that is, more persistently, by women than by men, the latter, as a rule, being more frequently given to acute outbursts; hence the frequency of delirium tremens in the male sex, and its comparative absence amongst females. Heavy drinking of short duration may cause acute failure of the heart's action. Slighter consumption daily, spread over a longer period (being always an excessive consumption), will produce a more persistent derangement.

Two conditions chiefly arise, according to my own observations —one, of dilatation, which may occur fairly suddenly, the other being one of habitual and constant rapidity of the action of the heart, *i.e.* tachycardia.

In both of these conditions there is an enfeeblement of the heart muscles, shown by the weakness of the systole, but in the latter form the condition would appear to be mostly one of faulty innervation. From the general proneness of peripheral nerves, rather than their central ganglia or nuclei, to be affected by toxic influences (more especially alcoholic), there is a potent reason for thinking that the tachycardia may be due to alcoholic neuritis of the cardiac plexuses or peripheral cardiac ganglia (which after all are only end-organs of the nerves). No evidence is forthcoming to show of any nuclear affection, so the balance of opinion is in favour of peripheral lesions.

I will exemplify these points by cases.

Case 1.—Mrs. T., æt. 43, married, several children. Has been drinking whisky, brandy, and stout freely for five or six years, gradually increasing the amount taken daily, and being occasionally intoxicated. Her illness began with menorrhagia, dyspnœa on exertion, and weakness in the legs, with frequent attacks of vomiting, especially in the mornings. She used to have many attacks of gastrodynia in earlier years.

I found that she had progressive weakness in the legs, which were not wasted; dyspnœa and palpitation on effort; anorexia, menorrhagia; œdema of the feet and ankles, hæmorrhoids. Her complexion was very sallow. A peculiar mental state, a combination of vacuity and placidity, with sudden fits of excitement and passion, with loss of memory, a strong propensity to tell lies, and a very erratic behaviour. Her mental state was never the same two days running. She had a subjective feeling of coldness, would stand any amount of bedclothes, and would sit on a hot day by a roaring fire. The knee-jerks were absent, she had pains almost constantly, and cramps in both legs, and the muscles of both thighs and legs were very tender to touch. The cardiac dulness was increased both to right and left, and there was an apical systolic bruit with feeble systolic contraction.

A month later the condition was the same, but aggravated. Constant pains in the legs; tenderness on touching or squeezing over the thighs, calves, and insteps. Dropped feet when in bed; but dorsiflexion of the feet and extension of the toes could be performed fairly well. Plantar reflexes were present and normal. Knee-jerks absent. No anæsthesia. The heart's action was very weak; pulse 100. No bruit audible. Considerable œdema of both feet and ankles, and also of the hands. Dyspnœa with hurried respiration. Partial anuria. Frequent action of the bowels, with a condition of tenesmus. Urine acid, sp. gr. 1020, loaded with albumin. Retinæ normal.

Subsequently I had her removed from home influences (as she would insist on having stimulants), and had her admitted into a private hospital. After five or six months she made a complete recovery, and has remained well.

The condition was evidently one of heart failure with ventricular dilatation, from weakness of the cardiac muscle. The feeble systole must have caused a tremendous loss of arterial tension, with a great fall in the general blood pressure. There was a back working in the general circulation, resulting in dropsy and albuminuria. In some of these cases of alcoholic dilatation the retardation of the circulation is so considerable as to produce serious effects. I remember one case, in a young man of about 34 years of age, in whom thrombosis occurred in both femoral veins which took months to clear up.

She was also in the first stage of alcoholic neuritis. For some months after she left the hospital, and had returned home feeling quite strong and well, her knee-jerks were absent.

CASE 2.—James C., æt. 43. Has been a heavy beer-drinker for some years, but, owing to the anxiety brought on by recent marriage, he has been lately taking spirits freely in addition. Has loss of appetite, and frequently has sickness in the morning. His legs began lately to swell, and he has got very short of breath on exertion, and has had a hacking cough at night without expectoration. Urine has been very scanty. Considerable œdema of both legs up to knees, with pitting. First sound of the heart very feeble and slapping. Pulse quick and feeble. No albuminuria.

With rest, light diet, abstinence from alcohol, a few brisk purges of calomel and mag. sulph., and a mixture of digitalis and nux vomica, all the œdema disappeared in a few days, and the heart's action became stronger.

A little later he came to see me again in the same condition as before, but, in addition, he told me that he had a fearful cough at night, so much so that he would wake up struggling for breath, with a choking cough, so that his wife had to give him cold water to drink, and to thump his back. This would occur two or three times every night, and always after a short sleep. He also had an irritating cough during the day. His feet were again swollen ; he had some inspiratory dyspnœa, and was slightly cyanosed. His heart's action was again very feeble. I found, on examining the throat, that he had an elongated uvula, with an œdematous bulbous extremity, which with the laryngoscope could be seen to lie in the glottic opening. This was the cause of the choking cough at night, and the inspiratory dyspnœa. I applied cocaine, and snipped the uvula off close to its base. The bulbous extremity was as large as a cherry, and was full of fluid like a nasal polypus. His cough was quickly relieved, and ceased at night. Examination of the larynx afterwards showed that he had a condition of pachydermatous laryngitis, with great thickening of the posterior fold, and of the ary-epiglottic folds, and also thickening of the ventricular bands, also thickening and congestion of the cords.

With treatment similar to that which he had before received the œdema again disappeared, and the heart's action again became regular.

The occurrence of ventricular dilatation in this case was more acute than in the preceding one, and, having improved, later on it again suddenly became evident.

Case 3.—Mrs. A., æt. 42. She has had hoarseness with cough and dyspnœa and frequent attacks of hæmoptysis for some time back. She has been a constant tippler for some years.

Examination of the heart showed great dilatation, especially of the right ventricle, with increased percussion dulness to both right and left. The ventricular systole was very feeble, and it had a slapping first sound, similar to that described in the last case. Examination of the throat revealed elongation of the uvula and pachydermatous laryngitis, also similar exactly to that described in the last case. With rest in bed in hospital and treatment she got quite well in a few weeks.

The next two cases differ from the preceding ones in that, though the heart was affected, there was no failure of the circulation.

Case 4.—James R., æt. 40. He has been a constant tippler for years, drinking everything that came in his way, and, though frequently fuddled, has never been badly intoxicated.

Complained of anorexia, insomnia, palpitation of the heart, tremors, and slight dyspnœa on exertion. To this he has been subject occasionally for many years, and always after any excess he suffers from the symptoms mentioned. He was a feeble, neurotic type of man. Twitching at the corners of the mouth; tremor of tongue and hands. Furred tongue; knee-jerks slightly exaggerated. Pulse quick, 110. Ventricular systole feeble, but heart sounds normal. I have seen this man periodically for some few years, and the condition of the heart has always been the same. The impulse is feeble, the systole weak, and the action rapid—from 100 to 120. The urine has always been normal.

Case 5.—Mrs. B., æt. 33. Owing to amenorrhœa for some three months, and morning sickness, she thought she was pregnant. The sickness became frequent during the daytime, and she began to lose flesh. On inquiry, I found that she had really been ailing for six months or more, and had sickness almost daily during that time.

17*th October* 1897.—Has been sick seventeen times, and has thrown up some blood. Great pain over the stomach and all round the waist. I found considerable enlargement of the liver, which reached downwards to the right iliac region, also to the median line, to the umbilicus, and quite across to the left border of the epigastric region, also upwards in the parasternal line to the level of the nipple. The enlargement was uniform; the liver felt hard, and the surface smooth. The fingers could easily be introduced under the edge of the left lobe, and the liver substance grasped between them. The edge felt sharp and hard. The organ was generally tender to the touch. There was neither ascites nor jaundice, and the bowels acted well. A uterine examination revealed no signs of pregnancy.

30th October.—Has still been frequently sick; no hæmatemesis. Pain all over abdomen, and soreness from retching.

31st October.—Has been sick forty-two times in forty-eight hours. Jaundice. Bile acids in the urine (Pettenkofer). Severe pain in epigastric and right hypochondriac regions. Evidently gall stones. Shortly after this she improved. The liver became reduced in size almost to normal. Jaundice disappeared, and she got well and put on flesh. Some months later she had another attack after a drinking bout, and the liver again became enormously enlarged and tender, and she has repeated vomiting without jaundice. She then also exhibited marked alcoholic neuritis, had double foot-drop with characteristic feet, loss of knee-jerks, cramps in the calf muscles, and soreness to touch from the knees down, with extreme muscular wasting. She also had pains in both legs, but had no anæsthesia. Her legs got very weak, and she frequently fell down and got both bruised and cut thereby.

She next developed attacks of cardiac palpitation, even when in bed, and became subject to menorrhagia. The heart's action was always rapid. I frequently saw her during some months, and the pulse rate varied from 100 to 130. The heart sounds were normal, but the systole was feeble. There was no evidence of failure of circulation.

She remained like this for some months, and during that time the condition of the liver varied. After any considerable drinking bout it increased in size, sometimes to what I have described, and when abstinence was secured it again diminished in size. She had one or two slighter attacks of biliary colic with jaundice. The neuritis remained about the same.

The condition of the liver was interesting, being an example of the fairly sudden increase in size to considerable enlargement that will occur in the early stages of alcoholic hypertrophic cirrhosis. The affection of the heart in this case was similar to that observed in the last, namely, one of palpitation and tachycardia.

Just a few words on the laryngeal affections observed in Cases 2 and 3.

Pachydermatous laryngitis is nearly always alcoholic in origin, and occurs in excessive beer-drinkers. The presence of an irritating elongated uvula, with constant friction of the glottic aperture, would also tend to keep up chronic inflammation, leading to the general thickening and infiltration which results in the so-called pachydermia laryngis. In neither of these cases was there any paralytic affection of the vocal cords, which has been shown by Dundas Grant to be an occasional though uncommon alcoholic phenomenon. There is no reason why the recurrent laryngeal nerves should not be affected by alcohol as readily as any other special nerves, and now that attention has been drawn to the matter by Dr. Grant, alcohol will be more frequently recognised as a factor in the causation of abductor paralysis, especially in cases where the etiology of the paralysis may be otherwise obscure.

As to the treatment of the more acute cases with heart failure I believe that repeated small doses of either calomel or blue pill and colocynth, followed by saline purgatives, are of great value, and the prolonged use of nux vomica or strychnine with ammonia and capsicum, with, if necessary, the addition of such direct cardiac stimulants as digitalis, strophanthus, and caffeine, are of the greatest benefit. Prolonged rest, in bad cases, and good feeding are also necessary.

CLINICAL RECORDS.

FOLIE À DEUX.

By HAMILTON MARR, M.D., *Senior Assistant Physician, Woodilee Asylum, Lenzie.*

THE term Folie à Deux, in its strictest sense, implies an insanity which affects two persons. The insanity is imparted by one of the two to the other, and the characters of the insanity are analogous or identical in the two cases.

Folie communiquée signifies an extension to a third, or to more than two or three persons, of an insanity which is similar or identical in all the persons affected. Insanity as an infective agent has long been recognised. The idea is popular, that persons who have had long associations with the insane become more or less affected by their associates. That this is true in cases predisposed by hereditary weakness may be conceded; it is quite untrue in the great majority of cases where no such predisposition exists.

Many cases are reported in medical journals of folie à deux and folie communiquée affecting members of one family or near relatives, but recorded instances in which the infection is transmitted, where no blood relationship exists, are somewhat rare; and it may be sufficiently interesting to narrate and analyse such an instance.

W. M'L. and his wife were admitted to Woodilee Asylum together, on 3rd December 1896. The husband was evidently the active agent in transmitting the insanity to his wife, who was the passive agent. The history of his mental troubles is thus given by the husband:—

"More than eight years ago I emigrated to Canada, and settled in Hamilton. I was unmarried at the time. I acquired a small drapery shop in this town, and then asked my present wife to come out to Canada. She came, and we got married.

"My wife and I attended the shop, and lived in a house above the shop. One day I had occasion to go to Ontario on business, and when there was told by a gentleman that Hamilton was becoming rather a wild place; on further inquiry, I was told that numerous murders were being perpetrated there.

"My suspicions about the murders thus aroused, I went home, determined not to let my wife know of what I had heard, but resolved to keep a careful lookout. My suspicions were soon justified. In the house next to where we stayed, an old lady resided alone; behind our house and this old lady's house was a hall, where Foresters held their meetings. The first occurrence of unusual interest I noticed, was the disappearance of a deacon of the church where I worshipped. The deacon had been invited by the old lady to her house; he accepted the invitation, and was seen by me going into the house, but he never came out. During the night strange sounds were heard from my neighbour's house, as of someone falling; almost immediately afterwards I opened one of the windows of my house, and, looking into the courtyard, saw two policemen. I asked them what was up, and they told me the deacon had been murdered and the body could not be discovered. After this murder of the deacon, a number of young men came to meetings in the Foresters' Hall, and none of them were ever seen again. I was told in a vision that they had all been murdered by the old lady and her accomplices, and the bodies were disposed of in a peculiar way—they were dissolved in acid, and the resulting fluid was run into drains. The heads would not dissolve, and they were packed in boxes, and sent away in coaches one stormy night.

"One night after the young men were disposed of, my wife's suspicions were aroused, and she and I, while lying in our bed, heard voices on the stair-head. On listening intently, we heard people planning to murder us. There was no sleep for us that night, and we resolved to leave the country the next day. In the morning we came down to business as usual, and, after we had prepared for our departure, as secretly as possible, the shop was shut up and the keys left with a friend in Hamilton. We set out for New York, and on our arrival there went to a hotel.

"We had been followed, however; and the hotel people had been communicated with by the murderers, as they drugged our coffee, and tried to poison us. We at once detected this, and rather than live in the hotel we walked the streets all night. Next day we got on board the steamer. At first it seemed as if we had got clear of our pursuers, but ere the ship sailed they boarded it, and made an organised attack on us in our cabin. We barricaded the cabin; and had we not made friends with the captain, who saw how the land lay, and told us to keep closely to our cabin, we would undoubtedly have been murdered. On leaving our ship at Greenock we made our way to Glasgow, and took a house there. I got work at various occupations, latterly as light porter. We have been the subjects of an organised conspiracy during our stay in Glasgow, and constant care and watchfulness has always been necessary. We felt our lives were in danger, and applied to the police, who advised us to go to Woodilee Asylum, where we would be safe."

The story of Mrs. M'L. does not differ materially from that narrated by her husband. She has identical delusions, and speaks about them in almost the same words her husband used. Her narrative begins a little differently. Her suspicions of the plot against her husband and herself were first roused by the anxiety and fear her husband showed; his manner changed after he got back from his visit to Ontario.

He became restless and talked to himself. She only got a key to this restlessness when she heard, along with her husband, people planning to murder them both. W. M'L., the husband, was, on admission to the asylum, æt. 35, and a physical examination showed that he was suffering from acute bronchitis. The area of cardiac dulness was increased. A.V.S. mitral, V.S. and V.D. aortic, murmurs were audible. He had no other physical symptom of importance. His weight was 7 st. and his height 4 ft. 7½ in.

Mrs. M'L. on admission had a slight bronchial catarrh, and a V.S. mitral murmur was audible. She was anæmic. There was nothing else noticeable in her physical condition. She weighed 9 st.

Remarks.—The husband was obviously weak-minded. He had an imbecile appearance, and was badly developed generally; he would not tell his story to the attendants; he told it readily to the medical officers in grandiloquent language, his grammar and many of his words being peculiarly his own. The delusions he had were probably the outcome of business difficulties and worries acting on a feeble mind.

He was very anxious about his wife, and the anxiety was mutual. The day after the admission of the patients, the wife was much excited, as during the night she had a vision and was told in it that her husband was dead. She would not settle until her husband was brought to her.

Both patients seemed very much bound up in each other. On one occasion in the large dining-hall, where the male patients sit on one side and the females on the other, the husband and wife rushed towards each other and made a scene, declaring that they would not be separated, and wanting to die together. The only therapeutical indication in these cases is the separation of the patients, in the hope of the recovery of the one to whom the delusions have been communicated. Both patients were kept apart until their removal to Gartloch Asylum; the wife became much more settled, and wrought industriously in the laundry.

No history of the patients previous to their admission to the asylum beyond their own statements could be obtained, making it impossible to say if there was hereditary neurosis in either case.

REVIEWS OF BRITISH AND FOREIGN LITERATURE.

Text-Book of Physiology. Vol. i. Edited by Professor E. A. Schäfer, LL.D., F.R.S. Edinburgh and London: Young J. Pentland. 1898.

This important work by a number of competent writers will be welcomed by all teachers of physiology in English-speaking countries, by many of their advanced pupils, and by not a few practitioners of medicine who may desire to refer to a comprehensive account of the most recent physiological work on subjects that may be of special interest to them. Those who are engaged in physiological research will also turn to it readily, to find a good critical digest and copious references to original papers that will prove highly serviceable. The first of the two volumes of which the book is to consist treats mainly of the chemistry of the animal body, and of some of the physical phenomena connected with its metabolism. The second volume is to include the mechanics of circulation, respiration, and muscular movements; the general physiology of muscle and nerve; and the special physiology of the central nervous system and organs of sense.

It is no doubt expected that the book will be used by candidates preparing for honours examinations, and it would have been as well to have stated on the title-page that it is intended for *advanced* students, for, of course, it is in no sense a text-book for the ordinary student: indeed, the advanced student must carefully consider how he is going to read the book, otherwise he may fail to derive the full measure of help the book is capable of yielding. If he begin with the two opening articles by Halliburton on "The Chemical Constituents of the Body and Food," and "The Chemistry of the Tissues and Organs," under the idea that he should attempt to master their minute details, he will probably soon arrive at the conclusion that his labours are not altogether profitable. After some loss of time, he will likely discover that the contents of these elaborate articles should not be read consecutively in the ordinary way, but merely referred to when occasion arrives during perusal of the later portions of the book; *e.g.* it could scarcely be advantageous to him to read in the early part of the book an account of the chemical composition of muscle and the manner in which the composition is affected by starvation and work, removal of the liver and section of its nerve, and so on; and then to find the metabolic activity of muscle discussed towards the end of the volume. We would therefore advise the advanced student to begin by consulting the index, so that he may be enabled at once to bring into line all the portions of the articles by different writers that bear on the subject of his study. It must be readily admitted that one could not expect an elaborate work compiled by several independent writers to have the perspective of a book produced by one or two authors working in close collaboration; but we venture to think that an arrangement of articles, which would have been more helpful to the advanced student, might have been devised. If the editor had adopted an arrangement similar to that in, say, Foster's "Physiology," the advanced student could have read the book consecutively, with comfort and with greater advantage than will now be possible.

But our criticism of the arrangement of the book must not be taken to indicate any lack of appreciation of the very valuable character of its several articles. Although Halliburton's chapters above referred to illustrate the difficulty and inadvisability of combining encyclopædic detail with the selected information suitable for a text-book, they will at all events be of service for consultation. Their preparation must have involved much labour, and it must be remembered that few things are more difficult than to write an intelligible and interesting account of the general chemistry of the body.

Schäfer's article on "Blood" is an admirable account of the subject. In the portion relating to coagulation, he gives a full critical statement of the views of authors, but we believe the reader would fail to discover that we owe more to Hammarsten than to any other recent author for our present knowledge of the intricate phenomena of coagulation. Schäfer indeed refers to Hammarsten's recent article in *Ztschr. f. physiol. Chem.*, Strassburg, vol. xxii.; but we venture to think that his indebtedness to it deserved fuller acknowledgment.

Gamgee's article on "Hæmoglobin" is such as might have been expected from one who began to work specially at the subject more than thirty years ago. He gives an elaborate, practical, and theoretical exposition that will be very valuable for reference.

We are glad to find him discountenancing Bohr's statements regarding the supposed combination of hæmoglobin with carbon-dioxide, that threatened to find a footing in our text-books. He refers to the neglected observations of Soret on the blood spectrum with the help of a fluorescent eyepiece, by which an absorption-band is revealed in the extreme violet that appears to be "even more distinctive of the blood colouring matter than the absorption-bands in the visible spectrum." Precise directions are given for its demonstration. We are, however, somewhat startled to find that on the far more familiar subject of the spectrum of carbonic oxide, he says (p. 239) that the two absorption-bands between D and E, "unless very closely studied, appear absolutely identical with those of oxyhæmoglobin," the only difference being that "both the bands are very slightly shifted in the direction of E." We have never found any difficulty in showing that the band near D is broader, while that near E is narrower than the spectrum of HbO_2, as Preyer long ago figured, and as Gamgee himself showed in his copy of Preyer's figure in his "Physiological Chemistry."

Waymouth Reid's article on "Diffusion, Osmosis, and Filtration," gives an admirable account of the work recently done on this subject.

The article on "The Production and Absorption of Lymph," by Starling, is specially interesting, because its author, after working under Heidenhain, felt obliged to abandon that eminent physiologist's secretory theory of lymph production, and return to the physical theory advanced by Ludwig. The numerous experiments on this difficult subject performed by the author have enabled him to write a very valuable article.

The elaborate chapter on the "Chemistry of the Digestive Processes," by B. Moore, abounds in references to the copious literature on this complicated subject, and bears full evidence of the great pains the author must have bestowed on its production. It abounds in details regarding the digestion of proteids, which will probably in the near future be regarded as of little more than historical interest, and it is to be hoped that the author will see good reason for curtailing his references to them in a future edition. Indeed, the whole article as it stands at present is more fitted for an encyclopædia than for an advanced text-book.

Langley's article on "Salivary Glands" is an excellent illustration of the style of scientific exposition suitable in a text-book for advanced students. It is well arranged, lucidly expressed, and altogether admirable. The writer is, of course, dealing with a subject on which he has done much research, but he has not, on that account, been led to amplify it unduly. The discussion of theories as to the mode of action of the secretory nerves of the glands is an excellent example of careful criticism.

J. S. Edkins contributes an excellent article on the "Secretion of Gastric, Pancreatic, and Intestinal Juices," while Noël Paton writes on the "Mechanism of Bile Secretion," an article which would have been rendered more useful if he had indicated the different experimental methods adopted by the authors he quotes in their study of bile secretion in the dog and other animals. Thus he quotes the results of observations made by Röhrig and by Paschkis, who simply counted, for short periods of time, the drops of bile that fell from a cannula introduced into the bile duct, and the results of observations made by the method of continuous collection and measurement, without informing the reader of the necessary difference in the value of the statements founded on modes of procedure so different; nor does he indicate when results were observed in animals non-curarised and breathing naturally, or curarised and kept alive by artificial respiration. In an advanced text-book, surely it is essential to state the methods by which observations have been made.

One of the best chapters in the book is that on "The Chemistry of the Urine," by F. G. Hopkins. The subject is admirably treated, and the article will be of great service alike to the physician and the physiologist. His discussion of the chemical and physical relations of the constituents of the secretion, its acidity, and its colouring matters, is particularly interesting.

Starling's chapter on "The Secretion of Urine" is pleasant reading. He discusses fully and clearly the theories of Bowman, Ludwig, Heidenhain, Nussbaum, and others regarding renal secretion; but we are unable to agree with the sentence (p. 658), "According to the Bowman-Heidenhain hypothesis, the secretion of urine is due to the activity of two sets of cells. The flattened epithelial cells covering the glomeruli take up from the blood water and salts and transfer them to the beginning of the urinary tubule," while the "rodded cells, lining the convoluted tubules and the ascending loop of Henle, secrete specific urinary constituents, such as urea and uric acid, together with a certain amount of water." That is the theory of Heidenhain, but not exactly the theory of Bowman, who had no knowledge of the layer of squamous epithelium that immediately covers the capillaries of the glomeruli. Bowman's words were these. The vessels in the glomeruli are "uncovered by any structure, they lie bare in a cell" (Bowman's capsule), "from which there is but one outlet" ("Physiological Anatomy," 1856, vol. ii. p. 495). Bowman therefore believed that the glomeruli simply act as a filtering apparatus for the "fluid portion of the urine, while the solid matter is separated by the glandular epithelium lining the convoluted portions of the tubes." Bowman regarded the secretion of water by the glomeruli as a purely mechanical act, while Heidenhain ascribed it to a vital action of the epithelium covering the glomerular capillaries. Starling's conclusion is that "we have at present no evidence that the cellular covering of the glomeruli acts otherwise than passively in the production of the glomerular part of the secretion" (p. 659). He therefore adopts Bowman's theory.

Schäfer's article on "Secretion of Milk," and that by Waymouth Reid on "Secretion and Absorption by the Skin," are both excellent. Physicians who may entertain doubts as to what they are to believe regarding the cutaneous absorption of watery solutions of drugs contained in baths, will find satisfactory information in this chapter.

The chapters on the "Chemistry of Respiration" and "Animal Heat," by M. S. Pembrey, are very elaborate, and must have entailed great labour in their production. They are brought well up to date, but we were somewhat startled on finding the reproduction of a drawing of the old and, we had thought, obsolete spirometer used by Hutchinson. If Mr. Pembrey obtain the spirometer made by Verdin, he will probably never desire to use Hutchinson's inconvenient instrument again. Advanced readers will certainly desire to know how the author has arrived at the conclusion that "the effect of light in increasing the respiratory exchange is probably to be attributed chiefly to the increased muscular activity of most animals in the light." It is scarcely enough to simply refer the reader to the controversy on this subject in a paper in the Italian archives. With regard to the effect of varnishing the skin of animals, the experiments of Laschkewitsch, on the effect of varnishing the skin of rabbits, are referred to as they have been for the last thirty years. In our opinion undue importance has been attached to them. The dog is a far more suitable animal than the rabbit for such experiment. A varnished rabbit is an exceedingly disconcerted and pitiable object; but a varnished dog is not apparently distressed by its novel condition, and at the end of a month seems none the worse. The article on "Animal Heat" above referred to is well considered, and we are glad to find that the author is very cautious regarding the question of "thermic centres in the brain."

The two closing articles of the volume on "Metabolism" and

"Internal Secretions" are by the editor. They are both of them, but more especially the latter, very valuable chapters, admirably adapted for the purposes of an advanced text-book.

Altogether, we heartily congratulate the editor and his coadjutors on the manner in which they have accomplished the laborious task of producing this volume, which, although mainly useful as a work for reference, will nevertheless be partially read by those who are preparing for honours examinations.

It is, of course, not intended that this book should be compared with the far more voluminous "Handbuch" edited by Hermann, but when the work is completed by the appearance of the second volume, we may anticipate—judging from what has appeared—that the book will, within comparatively moderate compass, adequately represent the existing state of physiological science. W. Rutherford.

System of Diseases of the Eye. Vol. II. Edited by W. F. Norris, M.D., and C. A. Oliver, M.D. Philadelphia and London: J. B. Lippincott Co. 1897.

In vol. ii. the subjects treated are—the examination of the eye, school hygiene, antisepsis, etc. Ten chapters and 350 pages are devoted to the first, the rest being disposed of in 200 pages, divided into four chapters. The chapters on the examination of the eye represent the work of eleven different contributors to the "System." The different subjects discussed, which, with the exception of "Mydriatics and Myotics," have directly to do with such an examination, are of course of very varying practical importance. By far the most important, namely, the determination of visual acuity, is rightly accorded the first place. This chapter is by Prof. Snellen of Utrecht, who was the first to provide a visual acuity test, which was at once based on a sound scientific principle and capable of easy practical application. Prof. Snellen has given here an excellent exposition of the principle which underlies his well-known test types. This is followed by a thorough, and at the same time modest, criticism of the test types of his many imitators. Most other test types have, as he shows, failed to comply with the real requirements; some in a way which makes them very imperfect as acuity tests. It has often surprised us to find how few ophthalmic surgeons have any proper conception of what it is that constitutes the real value of a suitable test for visual acuity. In fact, as regards most of the younger men especially, any test types seem to be accepted as equally suitable. Snellen's chapter should be carefully read. It has not only its natural place in such a work as the "System" before us, but comes as a much-needed authoritative exposition of the subject of which it treats. It is short, and possibly might be passed over on the idea that it contains nothing new. In point of fact, it does not contain any absolutely new matter, but it is quite certain that much that it discusses has been lost sight of by, at any rate, the younger generation of ophthalmologists both in this country and abroad.

The next chapter is on mydriatics and myotics. Inasmuch as mydriatics are frequently required to facilitate an ophthalmoscopic examination, and by some are used for their effect in paralysing accommodation, in determining the state of refraction, there may be some justification for the inclusion of this chapter amongst those concerned with the examination of the eye. On the whole, however, it seems rather out of place. Be that as it may, the chapter itself, which has been entrusted to H. Snellen, jun., is a very readable one. In it are detailed, with occasional graphic representations, the results of the experiments made mainly by Donders and his pupils. Too much is perhaps made of the, to say the least, rather problematical condition of spasm of accommodation; but this is one of the traditional myths which are hard to shake off. Some reference might have been made to the curious vertigo which is caused by a mydriatic when instilled into one eye alone, and which is sometimes found to be peculiarly disagreeable. The discussion which the writer gives of the merits of the more recent mydriatics and myotics is interesting, and goes to strengthen one's conviction that, with the single exception perhaps of pilocarpine, which, on the whole, seems the most valuable myotic, the older drugs still continue to hold their own in point of usefulness.

Lateral illumination, under which is also included the use of the corneal microscope, forms the subject of the next chapter. What has to be said on this somewhat limited subject is well recorded by Prof. Laqueur of Strassburg. This is followed by a description of the ophthalmoscope and the art of ophthalmoscopy. The chapter devoted to these subjects is by Gould of Philadelphia. It is far from being as exhaustive as the importance of the subject might reasonably entitle one to look for in a work of the scope of the "System." Nothing is made of the questions of illumination, corneal reflex, magnification, and others. The subject is treated elementarily, with a complete absence of originality in the manner in which it is presented. Even in style, its marked wordiness makes it somewhat wearisome reading. "Skiascopy," which follows, is well done by Jackson of Philadelphia, who has already elsewhere published an excellent monograph on this modern objective method of measuring refraction.

A more interesting chapter than the three preceding ones is on "Ophthalmometry and its Clinical Applications." This is contributed by Adolph Javal, jun., who has, no doubt, had the assistance of his father, the founder of what may be called clinical ophthalmometry. Javal's chapter is compiled in a suitably scientific spirit, and will repay study. No modern instrument is both so time-saving to the ophthalmic surgeon and so capable of affording desirable information as to the condition of the corneal curvature in cases which present unusual abnormalities, as Javal's ophthalmometer. The modifications, too, which have been introduced by Tscherning, make it possible to ascertain many points of interest in connection with the state of the lens and posterior surface of the cornea. They have indeed led to results of great scientific importance.

The two chapters which follow are entitled respectively, "Prisms and Prismometry" and "The Principles of and Methods for the Estimation of the Balance of the Extra-ocular Muscles." The former, by

Dennett, contains a good exposition of the optical properties and clinical uses of prisms. The latter, by Stevens, is a résumé of his own theories and methods of examination. These theories show a want of grasp of the practical meaning of muscular anomalies, and such an exaggeration of the importance of trivial deviations from the ideal normal, that the chapter is devoid of any real scientific value. The manner in which this and some kindred subjects have been taken up in America has, unfortunately, tended to lower American ophthalmology in the opinion of European surgeons.

To "Perimetry and its Clinical Value" 125 pages are next devoted. Wilbrand of Hamburg is responsible for the treatment of this matter. Although there may be not a few views expressed by the author, which would certainly not receive general acceptance, his is, on the whole, an instructive and well-written monograph, which it will often be useful to consult. Seventy-eight original drawings and perimeter charts are interspersed with the text. These contribute in great measure to the value of one of the most complete sections of the present volume. The next chapter, and the last on the examination of the eye, is the combined work of Thomson and Weiland. It discusses the question of the detection of colour blindness. In it the matter is treated practically and in a manner which is fully commensurate with its importance.

The next section, on school hygiene, though not concerning the eye alone, refers to matters which certainly find an appropriate place in a large work of this kind. Different questions as to arrangement of class-rooms, lighting and air space, sanitation, seats, desks, home preparation, etc., are treated in a practical, common-sense manner by the author, Prof. Risley. There can be little doubt that all that is here recommended is in the way of improvement on existing school construction, and is well worthy of adoption. There can hardly be said to be anything altogether novel in Prof. Risley's treatment of the subject; but it brings together the best recommendations of those who have devoted time to the consideration of this important practical subject. Even although the necessity for certain reforms may in reality be less urgent from the point of view of ocular requirements than they are held to be, there can be no question as to the advisability of adopting them on more general hygienic grounds. There follows a chapter on "Blindness: its Frequency, Cause, and Prevention." In it an interesting comparison is made of the statistics of different countries. Both disease and accident, as causes of blindness, are discussed in a way which makes instructive reading. This elaborate and well-written chapter, which cannot fail to be most useful for reference, is contributed by Minis Hays of Philadelphia.

Dr. Andrews of New York is the author of the short chapter on "Antisepsis," which also includes a discussion of asepsis. It contains drawings of several more or less convenient forms of sterilisers, both for instruments and dressings. The concluding chapter treats of the micro-organisms in the conjunctival and lachrymal sacs. This is a comparatively new subject, which grows apace with the science of bacteriology. The ophthalmologist cannot afford, any more than the physician or surgeon, to disregard the study of this branch of pathology. The authors of this chapter, M'Farland and Kneass, are both practical bacteriologists, and have given an excellent description of the methods of detection and cultivation of the different micro-organisms which are to be found in this situation.

Altogether, the second volume of the "System of Diseases of the Eye" fully maintains the standard of the first instalment. As in the previous volume, the space accorded to the different subjects is far from bearing any close relation to their respective practical or scientific values. This is probably unavoidable in a book entrusted to so many different writers. Nor in a book of reference can it be said to be of consequence, except where the mistake is made, as has seldom been done so far in the work before us, of doing scant justice to the most important subjects.

G. A. Berry.

A Clinical Text-Book of Surgical Diagnosis and Treatment. By J. W. Macdonald, M.D. London: The Rebman Publishing Co. Ltd. 1898.

In his preface the author tells us that this work is designed to answer the two questions which arise in connection with every case that comes under a surgeon's notice, "What is the disease or injury?" and "What is the proper treatment?" We are not therefore to look for any detailed description of the pathology of surgical affections nor of their etiology, and the conditions that aid in the formation of a correct prognosis are also quite outside the scope of this work. On reading the text, however, we find that the author has not adhered to his original plan as disclosed in his preface, and the scope and plan of the work differ but little from those of other text-books of surgery. Pathology is dealt with very slightly indeed, and etiology almost as little, while symptoms, diagnosis, and treatment are discussed at much greater length. We must also add that the work cannot in our opinion be correctly described as one dealing practically with surgical diagnosis, or affording a ready answer to the question, "What is the disease or injury?" a patient is suffering from. Injuries and diseases are discussed in the same order and sequence as in many other systematic treatises on surgery, so that a practitioner would have to form some idea of the nature of his patient's ailment before he could consult Dr. Macdonald's work with any advantage, and would then require, in a great measure, for himself to con his pages to contrast the symptoms of the possible affections. A work on diagnosis must be planned on altogether different lines from those that are rightly followed in a systematic treatise. It must start with some salient symptom or feature common to many diseases, and then show how, by a particular method of examination, one and another of possible alternatives may be excluded, and a correct opinion arrived at.

So far as the portions of the work devoted to surgical treatment are concerned, we find them in no way different in scope to the similar paragraphs in other surgical text-books. Treatment is not described or discussed in more detail than elsewhere, and in some instances the directions given are very scanty. For example, all the guidance in the treatment of popliteal aneurysm is given in one line; the entire sentence is this: "*Treatment.*—Flexion, proximal compression, elastic bandage, or ligature." For all practical purposes such a statement is valueless. Our readers must not think, however, that this is Dr. Macdonald's usual style of dismissing the subject of treatment. Far from it. We quote it, because it is a striking and extreme example of what we mean when we say that treatment is discussed in relation to various surgical affections in general, and not with that attention to detail that is required to make it applicable to a patient in particular.

The more we have read of this work the more strongly we have realised that it is really a text-book of surgery, in which very little attention is given to pathology and etiology; and that this omission of the great basis of sound practical surgical knowledge is not compensated for by any special fulness in the discussion of either diagnostic or therapeutical problems. We have marked many passages in which Dr. Macdonald is vague in statement, some in which we hold him to be inaccurate, but, having spoken of the work as a whole, we need not enter into these details. We regret that we cannot greet this work more cordially, for it is the result of no little labour, and in many places bears evident signs of a good deal of research and of wide knowledge of current surgical literature. Dr. Macdonald may possibly reconsider his plans, and come to see that the lines laid down by many previous authors, and sanctioned by generations of teachers, students, and practitioners, are after all the best. If he does, and then recognises that the production of a good text-book of surgery may worthily crown a life's work, he will no doubt lay his professional brethren under a debt of obligation.

A. PEARCE GOULD.

Diseases of the Stomach: A Text-Book for Practitioners and Students. By MAX EINHORN, M.D., Instructor in Clinical Medicine at the New York Post-Graduate Medical School and Hospital, etc. New York: William Wood & Co. 1896.

THERE is no doubt that for some time back the Germans have been ahead of the practitioners of this country in the scientific appreciation and treatment of gastric ailments. Now it is questionable whether some of the American physicians have not outstripped the Germans. Although the credit of originating scientific investigation into the subject belongs (after Beaumont) to Germany, if ingenuity, shown by the invention of marvellous instrumental aids to the diagnosis of the ills the stomach is heir to, be regarded as any criterion, the enterprising and inventive physicians of the New World, to use a vulgarism, "take the cake." By means of these instruments one can lower a silver bucket attached to a cord into the stomach, as into a well, and draw out the contents; can transillumine the anterior abdominal wall, be it not too fat, with an electric light glowing in the stomach, immersed in water introduced into that organ; can register on a drum the peristaltic movements of the stomach wall by means of an indiarubber bag, passed into it when collapsed, blown up *in situ*, and compressed whenever the long-suffering organ begins to take exercise; or, better still, can register these movements by the make and break of the electric current, caused by the agitation of a metal ball constituting one pole, surrounded by centripetal metal projections, almost but not actually in contact, the movements of the gastric walls writing their characters and extent in a Morse code, by no means illegibly; and, finally, can not only douche the stomach, but actually massage its walls *in situ*, through the application of a revolving sponge at the end of a stomach tube, which can be made to spin round rapidly, and brush the mucus off the mucous membrane, and thus stimulate sluggish motor power.

One of the most prominent of these American physicians is the author of the present volume, and its publication serves a good purpose in acquainting us with the most modern accessions to our knowledge of diseases of the stomach.

The book under review is largely an extension of the articles written by its author for the "Twentieth Century Practice of Medicine," altered in such a way as to give the more practical aspect of the subject, especially with regard to diet and treatment. After a short description of the anatomy and physiology of the alimentary canal, the author enters fully into all the many methods and test meals which can now be made use of in the examination of the patient suffering from gastric disorder, and into the numerous tests devised for the analysis of the stomach contents or vomited matters. A fuller account of the different instruments used for the removal of the stomach contents, for the electric lighting up of its cavity, the application of electricity to its walls, for swabbing the mucus off the mucous membrane, for registering the peristaltic movements, and for other purposes, is to be found in this part than in any other treatise on the subject. Many of these instruments are of great interest from a scientific point of view, though there is some doubt as to their actual efficacy in the treatment of disease. Very possibly much of the good done by one might have followed the use of another, the chief effect being mental and suggestive. The chapter on diet is compact, and full of well-chosen facts. The classification of diseases of the stomach adopted will rather tend to confuse readers. The absolute division into organic diseases with constant lesions, functional diseases with variable lesions, abnormal physical states of the stomach and nervous affections, is a little arbitrary, for conditions are often met with which may come under more than one of these headings. The point which will especially be apt to mislead is the entire separation of functional disease of the stomach with variable lesions from nervous affections, because the one class is intimately connected and interwoven with the other. It must be confessed also that Dr. Einhorn is rather too fond of applying new and awful names to comparatively simple conditions, and thus of burdening our already over-weighted medical nomenclature with synthetic appellations. Hypanakinetic and hyperanakinetic stomachs may be comprehensive terms for diminished or increased movements of their walls respectively, but they neither look nor sound pretty. But this is by the way, and the actual accounts of the different conditions are most excellent, will prove of great service, and will afford much information to anyone reading them.

A. Lockhart Gillespie.

Treatise on the Diseases of Women. By ALEXANDER J. C. SKENE, M.D., LL.D. Third Edition. London: H. K. Lewis. 1898.

IN the preface to the first edition of this treatise the author states that his purpose is "to bring together the fully matured and essential facts of the science and art of gynæcology." In reading the book no one could fail to be impressed by the fact that Dr. Skene is writing from a large clinical experience. The various ailments are discussed in a way that shows that the author has carefully studied them in their practical aspects, and that his views are the result of years of careful clinical observation. Further evidence of this is given by the illustrative cases which are appended to each chapter. We are not sure, however, that this plan is altogether a good one; at least it is one which should be adopted with discretion. In many instances the illustrative cases are given at considerable length and with many details, so that they take up much more space than the account of the disease they are meant to illustrate.

The book is a large one, but it is written in a pleasant readable style, and the descriptions are not condensed to such an extent as to make them difficult to follow. Its whole tone is one of sober statement of fact and opinion. We believe that it is representative of American gynæcology at its best, and that is saying a good deal.

While there is an absence of any attempt to unduly push favourite hobbies, there are many passages in which the author gives original methods of treatment or original theories of the way in which some pathological conditions are produced. In his description of flexions of the uterus he seems to regard imperfect invagination of the cervix uteri in the vagina as one of the causes of anteflexion, and he gives an account of a plastic operation to relieve this condition. He is a thorough believer in the use of the clamp and cautery in the treatment of the pedicle in ovariotomy, and he also adopts a similar method in vaginal hysterectomy. His description of the pelvic floor is brief but clear, and in the account of injuries to which it is liable he emphasises the importance of the subcutaneous lacerations of muscles and fascia which sometimes occur during labour.

Dr. Skene is a firm believer in the importance of laceration of the cervix uteri as a cause of local and general ill health, and advocates Emmet's operation for its relief. He also draws attention to the serious conditions which may accompany cicatrices of the cervix and vagina, a subject which is often entirely omitted in gynæcological text-books. For prolapsus uteri he has given up the operation of colporrhaphy, and relies upon the combined use of mechanical supports and operations on the cervix uteri and the pelvic floor. He makes the somewhat curious statement that the vagina will contract if pessaries are properly employed. In the chapter on retroversion of the uterus he notes the wide divergence of opinion as to the usefulness of pessaries for retroversion, and, while he himself believes that pessaries are of great value, he thinks that "if the harm done should be placed opposite the good accomplished by all the pessaries in use, the account would be about equally balanced."

The account of fibroid tumours of the uterus is rather short. Th various methods of treatment, medical and surgical, are given, but there are no definite directions as to their suitability in individual cases. The statement that "since hysterectomy has been perfected, the removal of the ovaries for the cure of fibroids has been abandoned by the vast majority of surgeons," is open to question. In certain cases it is still the operation of choice amongst a large number of gynæcological surgeons, in this country at any rate. The extraperitoneal method of hysterectomy is mentioned as a matter of historical interest; Baer's and Kelly's intraperitoneal methods are fully described; but nothing is said of the total extirpation of the fibroid uterus by the abdomen, or by the vagina, or by the combined method.

Nearly one-third of the book is devoted to diseases of the urinary organs. This section supplies such a complete and careful description of the diseases of the bladder and urethra in women, that the value of the treatise is greatly enhanced. ARCHIBALD DONALD.

Greig Smith's Abdominal Surgery. Edited by JAMES SWAIN, F.R.C.S., Professor of Surgery, University College, Bristol. Sixth edition. Bristol: J. W. Arrowsmith; London: J. & A. Churchill. 1898.

WE congratulate Mr. Swain on the success which has attended his editing of the sixth edition of "Greig Smith's Abdominal Surgery." The work is so well known and appreciated, both in this country and on the Continent, that it would have been the subject of sincere regret had its progressive issue ceased with the life of its lamented author, who had no small share in raising the surgery of the abdomen to its present high position. The editor states in his preface that little change in the text has been necessary in the present editions, beyond keeping it abreast with recent advances in the subject; that this task has been very ably fulfilled by Mr. Swain is most evident throughout the work, which we have read with great pleasure and satisfaction.

ALEXIS THOMSON.

A Handbook of Therapeutics. By SYDNEY RINGER, M.D., F.R.S., and HARRINGTON SAINSBURY, M.D. 13th edition. London: H. K. Lewis. 1897.

WHEN a thirteenth edition of a book is called for, any notice of it is surely superfluous, further than by drawing attention to any improvements and additions. Thanks to the indefatigable industry of German chemists, numbers of new synthetic remedies have been introduced since the twelfth edition appeared, some of them of value, many fleeting shadows of a day. A selection of these new preparations has been made, and only those inserted which were thought worthy of consideration. We note that lysidin, erythrol-tetranitrate, and salicylate of colchicine are among those thrown out. Besides those novelties, serum therapeutics has been brought into being, and a separate chapter is devoted to the consideration of the advantages and evils attendant upon the trials of this promising youngster. A new section has been added in connection with the use of the digestive ferments. Though some of the statements made in the volume may be of questionable accuracy, the book as a whole is a most valuable guide for the practitioner desirous of possessing more than an empirical knowledge of the drugs with which he experiments upon more or less empirical diseases.

A. Lockhart Gillespie.

A Manual of Practical Medical Electricity. By Dawson Turner, M.D., F.R.C.P.Ed. 2nd edition. London: Baillière, Tindall, & Cox. 1897.

This Manual has reached its second edition, the value of which is enhanced by the addition of an account of the Röntgen X-rays, with the use of which the author is specially familiar.

The book combines an account of the more elementary essentials of electricity, with an account of its uses as a diagnostic and therapeutic agent. It is obviously impossible for such a work to contain much that is original, but the account of the author's experiments in applying the estimation of electrical resistance to diagnostic purposes in the examination of urine is novel and interesting.

The book is to be commended to those who desire to gain a knowledge of the many medical and surgical uses of electricity; the facts are imparted in a clear and scientific manner.

Robert A. Fleming.

RECENT ADVANCES IN MEDICAL SCIENCE.

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MEDICINE.

UNDER THE CHARGE OF
A. LOCKHART GILLESPIE, M.D., F.R.C.P.Ed.,
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The Etiology of Rheumatism and Gout.

Mordhorst (*Centralbl. f. innere Med.*, Leipzig, April 30, 1898) argues in the first place that the fact of salicylate of soda frequently proving beneficial both to patients suffering from gout and to those suffering from chronic rheumatism, indicates the common origin of the two diseases. Before now (cf. *Virchow's Archiv*, 1897) he has stated his belief that chronic rheumatism may often be only an early stage of gout. Experimenting upon 0·1 per cent. solutions of soda, saturated with uric acid, he finds that the addition of small quantities of the phosphate, bicarbonate, acetate, tartrate, sulphate, chloride, and lactate of sodium causes deposition of granules of urate of sodium, readily soluble on the further addition of caustic soda solution, if it be added at once, but the less soluble the longer they have been formed. Drops of the soda solution saturated with uric acid can be left under a watch glass for several days without change, to exhibit to the naked eye a marked cloudiness from the formation of urate granules on the addition of any of the salts already mentioned. A 2 to 3 per cent. solution of soda similarly saturated showed no formation of urate of sodium after the addition of salicylate of sodium, or on the further addition of any of the salts already noted to their mixture. The granules formed in the first series of experiments disappeared for the most part on the addition of the salicylate, the undissolved granules in from two to five hours becoming transformed into needle or star shaped crystals. The original granules when kept in a closed vessel retain their granular shape for months, but become lighter in colour and more transparent, and in most cases finally are found associated with needle and star shaped crystals of acid urate of soda.

From these observations it is deduced that the deposition of urates in the connective tissue and cartilages of the affected organs is the probable cause of chronic rheumatism. Mordhorst regards the blood serum and lymph circulating in these tissues as saturated with uric acid, leading to urate formation and deposition owing to the influence of the salts of the blood stream.

The fluid removed from a collection round a tophus in a very gouty patient gave a distinct alkaline reaction, and contained both crystals of the acid urate and granules of the amorphous urate of soda.

A few of the conclusions terminating his paper are: The alkalinity of the serum and lymph in the tissues is due to carbonate of sodium, not to the bicarbonate or phosphates; nothing promotes the formation of urate granules more than the addition of acids, and nothing hinders this more than the administration of carbonate, bicarbonate, and salicylate of sodium. Salicylate of sodium hastens the transformation of urate granules into needles, shortens the inflammatory stage; but if some of the crystals remain *in situ*, a recurrence of the disease is rendered more likely.

Salicylate of sodium subdues the attack, but often induces recurrence. The granular urates are decomposed by oxidation, the crystals are not; while the administration of carbonate or bicarbonate of sodium increases the solubility of the crystalline urates indirectly by facilitating the oxidation of the uric acid, the crystals being the more soluble the less uric acid there is in the solution.

Carbonated saline and mineral waters, containing only small quantities of lime compounds, form the best means of giving bicarbonate of sodium.

Bloch (*München. med. Wchnschr.*, April 12, 1898, *et seq.*) deals with acute rheumatism. The literature of the subject shows that acute rheumatism, unlike diphtheria, cholera, etc., cannot be due to any one specific organism. The occurrence of *angina rheumatica*, known to Hippocrates, is a clinical illustration of the connection between angina and acute articular rheumatism, but there is no special form of angina which precedes the acute rheumatic condition; there may be only a slight catarrh present, or a deep lacunar inflammation, a herpetic or suppurative tonsillitis. There is no relationship between the severity of the angina and the following rheumatic attack, nor between the time of the appearance of the first and the onset of the second; 70 to 80 per cent. of all cases of acute articular rheumatism suffer from precedent angina, and such cases may be regarded as suffering from bacterial infection and metastasis from the tonsillar condition. It is a form of mild pyæmia. Many other diseases may precede acute rheumatism, proving a similar source of infection as the angina. So scarlet, typhoid, and puerperal fevers, dysentery, diphtheria, gonorrhœa, and bronchiectasis, have been noted as the causal source. Other attacks are recorded as following boils, whitlow, fistula in ano, and in one case vaccination and infection of the vesicle by staphylococci.

Menière and Wolf have recorded cases in which acute otitis was shortly followed by acute rheumatism. In one of Wolf's patients the ear symptoms followed angina, to be followed by the acute rheumatic symptoms, with pericarditis and pleurisy. Bloch gives details of nine fresh cases of otitis media followed by acute rheumatism. In one case a radical operation on the ear appeared to precipitate an attack, while not the slightest sign of the disease had been shown for three and a half years since the suppuration in the ear ceased, although four attacks had occurred in the three foregoing years. Several instances of chronic rheumatism following otitis media are also given.

The moral of all this is, treat the original source of the infection. The height of the barometer or the direction of the wind are of less importance to those with a rheumatic tendency than the early treatment of any local inflammatory process capable of infecting the blood stream; and, should an attack occur, guard against the likelihood of a return by removing all possible sources of auto-infection.

FEVERS.

Progress.—Deming (*Med. Rec.*, N. Y., January 1, 1898) draws the following conclusion from a study of the results of prophylaxis and treatment upon the prevalence of and mortality from infectious diseases. Sanitary measures alone have reduced the number of deaths from diphtheria, and antitoxin promises to reduce it still further. Scarlet fever appears to be less common in the great cities of the world, and to show a lessened tendency to appear in great epidemics, judging, at least, from the mortality returns. Enteric fever is also on the wane.

Relapses in scarlet fever.—Cosgrave (*Dublin Journ. Med. Sc.*, Sept. 1897) records two cases of relapse in scarlet fever. Both patients were girls of 9 years. The one showed a temperature of 103° F. on the second, fourth, and fifth days; falling to normal on the ninth day. The attack was a severe one of scarlatina anginosa. On the twenty-eighth day, when desquamation only persisted over the legs, vomiting heralded a relapse with a temperature of 105° F. On the following day, when 5 minims of guaiacol were given, the temperature fell to 98° F., but rose again next day to 103°·8 F., repetition of the guaiacol bringing it down to normal. Desquamation recommenced on the eighth day of the relapse. Eight weeks from the commencement of the original attack she was allowed to leave hospital. The second patient suffered at first from a mild attack of the fever, with a maximum temperature of 102°·4 F. On the thirteenth day, two days after desquamation had begun, some enlargement of the cervical glands was noticed, with a rise of temperature to 101°·6 F. On the twenty-fourth day a relapse occurred, with a temperature of 105° F., which responded as in the other case to guaiacol (7 minims). Desquamation was repeated, and was still proceeding twenty-eight days from the outset of the relapse, and fifty-one from the original attack.

Rothschild (*Allg. med. Centr.-Ztg.*, Berlin, 1897, Bd. lxvi. S. 43, quoted *Schmidt's Jahrb.*, Leipzig, 1898, No. 1) describes a case of acute polymyositis scarlatinosa. The symptoms appeared in the course of a second attack of scarlet fever in a boy of 8.

RELAPSES IN MEASLES AND MUMPS.

FELTZ (*Gaz. hebd. de méd.*, Paris, 1896, No. 84) and Eonnet (*ibid.*, No. 87) observed two and four cases respectively of undoubted relapse after first attacks of measles, the recrudescence of the disease occurring within twenty days of the appearance of the first eruption. The two attacks were identical in character in every case, and could not have been due one to rötheln and the other to measles. Eonnet also states that he has observed 122 instances of second distinct attacks of measles in the same patient, ninety-seven of whom were between 6 and 13 years, and had suffered from it four years previously; twenty-five were aged from 14 to 18, and whose first attack dated thirteen years back.

Busquet (*Rev. de méd.*, Paris, 1896, No. 9) some time ago gave particulars of recurrent attacks of mumps, two after fifty-eight and ninety-two days, and three after seven months, one year, and three and a half years respectively. In one case the second attack was followed on the twenty-second day by a relapse.

Séglas (*Presse méd. belge*, Bruxelles, May 1, 1897) gives an account of a case of measles in which a female æt. 30 contracted a mild form of the disease from her children, after apparently convalescing, and about twelve days from the onset of the fever, suddenly became delirious and confused—"Confusion mentale pseudo-méningitique." At the end of another week the temperature rose to 38° C. (100°·4 F.), the next day to 39°·8 C. (103°·6 F.), and on the third day to 40°·4 C. (104°·7 F.), and the patient presented many of the symptoms of meningitis, but no trace of any rash or glandular enlargement. Cold baths and injection of caffeine were employed, and after three days caused a definite lowering of temperature. Convalescence followed, but the state of mental confusion did not disappear for three weeks.

Whether such symptoms proceed from a secondary infective process by the poison of measles, or from another distinct poison, has not as yet been determined.

New Sign for the Early Diagnosis of Measles.

Koplik (*Med. Rec.*, N. Y., April 9, 1898, see also *Arch. Pediat.*, N. Y., December 1896) again calls attention to a sign, already described by him in the earlier paper referred to, which he states enables the diagnosis of measles to be definitely formed twenty-four or even seventy-two hours before the appearance of the cutaneous rash. The sign consists in the appearance of a dotted red eruption over the mucous membrane of the lips and cheek. In the centre of each red spot a small bluish white speck can be seen in a strong light. These specks always retain their bluish white appearance and remain punctate, not coalescing, while they fade soon after the cutaneous rash has developed. Details are given of sixteen cases, in which this sign led to a correct diagnosis, either before the skin eruption had appeared or when the skin rash was only slight and indefinite.

Kidney Insufficiency in Hepatic Disease.

Chauffard and Chavasse (*Presse méd. belge*, Bruxelles, 12th March 1898), by injecting methylene blue hypodermically, show that the action of the kidneys in patients suffering from hepatic derangements is altered both physically and rhythmically. That is to say, that while in health the excretion of the blue in the urine rises gradually to a maximum and as gradually falls, in some cases of hepatic disease of various origin the blue is eliminated continuously but in fluctuating amounts, the different maxima occurring cyclically, while in other cases it is got rid of intermittently. The authors ascribe importance to this symptom, as indicative of some influence upon the permeability of the renal secretory apparatus when the liver is diseased.

HEPATIC CIRRHOSIS.

MORSE, in a study of thirty-seven fatal cases of the disease (*Boston Med. and S. Journ.*, March 10, 1898), obtained a history of alcoholism in thirty; no data on this point were sought for in the other cases. The common symptoms of the disease were, ascites in 62 per cent. of the cases, jaundice in 54 per cent., dilated veins in 40 per cent., hæmorrhage (œsophageal, 2; duodenal, iliac, and hæmorrhoidal, 1 each), 22 per cent., and indigestion 87 per cent. In 82 per cent. of the patients, nutrition was good, in the others poor. The liver could be made out to be enlarged in thirteen, of normal size in eleven, and small in thirteen. None of the cases resembled in their symptomatology Hanot's hypertrophic cirrhosis with chronic icterus, but the spleen was enlarged in twelve of the cases with large livers, in nine of those with normal size of liver, and in ten of those with small livers. There was no relationship between the size of the spleen and the occurrence of ascites, pointing to the cause of the enlargement being other than congestion of the portal system, perhaps to infective processes (as already suggested in some of the previous papers abstracted). In twenty-two cases the kidneys were affected; in seven with passive congestion, in six with diffuse, and in nine with interstitial disease.

The authors conclude that cirrhosis of the liver is comparatively rare, generally due to alcohol, and may be accompanied by either enlargement or diminution of liver bulk, both due to increase of fibrous tissue. Congestion of the portal system affects the abdominal organs less than is usually supposed, and the associated lesions are frequently caused by changes in the organs affected, similar to those in the liver and spleen.

CATALEPSY AND PSYCHOSES IN JAUNDICE.

DOMSCH and Cramer (*Berl. klin. Wchnschr.*, March 28, 1898) treat of this subject. Domsch has seen many cases of epidemic jaundice in children, commencing annually about July, most numerous in November, and disappearing by January. Many of the patients exhibit cataleptic symptoms which, in Domsch's opinion (corroborating previous observers), are due to a specific intoxication, from a poison produced by the action of organisms or their toxins on the hepatic cells. In a second class of case, the symptoms simulate acute yellow atrophy, are accompanied or followed by acute mental symptoms, but the result is not necessarily fatal. In a case, details of which are given, vomiting was so persistent that hypodermic injection of saline solution was practised with excellent effect, to make up for the deficiency of water in the body, owing to the drain of fluid from the mouth. Leichtenstein obtained temporary benefit by such injections in acute yellow atrophy.

Further information about the same subjects may be obtained from Chauffard (*Presse méd. belge*, Bruxelles, 11th Aug. 1897), Devereux (*Lancet*, London, July 24, 1897), Gilbert et Garnier (*Compt. rend. Soc. de biol.*, Paris, 3rd July 1897), Merklen (*Semaine méd.*, Paris, 12th May 1897), Ramond (*Presse méd. belge*, Bruxelles, 24th April 1897), Letulle (*ibid.*, 24th March 1897), Kelynack (*Birmingham Med. Rev.*, February 1897), Lyonnet (*Lyon méd.*, 28th March 1897), Dumstrey (*Deutsch. med. Wchnschr.*, Leipzig, 7th Jan. 1897), Bonard (*Gazz. d. osp.*, Milano, 3rd Jan. 1897), Heineke, (*Beitr. z. path. Anat. u. z. allg. Path.*, Jena, Bd. xxii. S. 2), Sicard et Remlinger (*Rev. de méd.*, Paris, tome xvii. p. 9), Laborde (*Bull. Acad. de méd.*, Paris, 19th Oct. and 2nd Nov. 1897).

SURGERY.

UNDER THE CHARGE OF

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TOTAL EXTIRPATION OF THE BLADDER.

MM. **TUFFIER ET DUJARIER** of Paris report a successful case of total extirpation of the bladder for tumour. The patient was a male, æt. 40, who had suffered from bladder symptoms for three years. These consisted in painful cystitis, with abundant and irregular hæmaturia. For purposes of exploration the bladder was opened above the pubes, and an indurated malignant tumour was found infiltrating the entire mucous membrane. The growth appeared to be confined to the bladder. The radical operation took place a fortnight later. With the patient in the Trendelenburg position, an incision was made in the form of an inverted T, of which the vertical limb corresponded to the linea alba, and the horizontal limb to the upper margin of the pubes, extending the entire distance between the two inguinal canals. When the flaps were raised, the access to the field of operation was most satisfactory. The wall of the bladder was stripped by the fingers from the surrounding tissues, first in the direction of the floor of the organ. The neck of the bladder was clamped and cut across, and the open end of the urethra touched with the actual cautery. After clamping the vesical arteries and ureters, these were cut across, first on one side and then on the other. It was then comparatively easy to strip the fundus of the bladder of peritoneum without opening the latter. The clamps on the arteries and ureters were then removed, the former ligatured and the latter provided with catheters. An opening was then made in the anterior wall of the rectum across the pouch of Douglas, and each ureter with its catheter was passed through this opening and brought out at the anus. The large suprapubic wound was packed with gauze and partly closed with sutures. In the after-treatment, recourse was had to saline injections into the veins of the arm. Urine flowed freely from the ureteral catheters until the seventh day, when it began to leak from the wound above the pubes; there was also a slight escape of fæces. The patient made, however, an excellent recovery, and was going about quite well two months and five days after the operation, the urine which escaped from the fistula above the pubes being collected in a urinal. Four and a half months later he died without any information being obtainable.

In commenting upon the operation, the authors point out that it can be but rarely indicated, for it is quite exceptional to meet with a tumour so extensive as to require complete extirpation, and, at the same time, definitely confined to the bladder. The presence of a fistula above the pubes, resulting from an antecedent exploratory cystotomy, renders the operation more difficult. In stripping the bladder from the peritoneum and adjacent tissues, it is a great help to drag the organ outside the wound, bit by bit, with strong forceps, as in a vaginal hysterectomy. The neck of the bladder should be clamped before being divided, otherwise it may be difficult to control the abundant venous hæmorrhage. The best method of disposing of the ureters is still under discussion. In the female, they should be made to open into the vagina, for the latter may be converted into a bladder; and in a young woman it is as well to suppress the catamenia by removal of the ovaries.

In the male there are three alternatives—(1) They may open on the abdominal wall—this entails, however, a continual leakage of urine; (2) they may open into the stump of the urethra—this has only proved satisfactory when it has been possible to preserve the neck and sphincter of the bladder; (3) they may be grafted into the intestine, preferably the sigmoid flexure—this has hitherto proved to be the most practicable and successful, both experimentally and clinically, and is, therefore, to be regarded as the method of choice.—*Rev. de chir.*, Paris, April 1898.

ABSCESS OF THE URINARY BLADDER.

ROCHET of Lyons distinguishes between abscesses in the substance of the bladder wall and those in the perivesical tissues. The former are either submucous or intramuscular; they are multiple, and may be found in all parts of the bladder wall. The submucous abscesses never attain any size, because they rupture into the cavity of the organ, and may heal. The intramuscular abscesses may rupture into the tissues surrounding the bladder, and lead to a suppurative perivesical cellulitis, which may become encapsuled or rupture into the peritoneum or into the bowel, or in the groin. The perivesical abscesses are mostly secondary to abscess in the wall of the bladder. They may attain a considerable size, and contain a pint or more of pus. They are nearly always situated in relation to the anterior or posterior wall. In the region of the neck of the bladder, they may be mistaken for a prostatic abscess. They may be also mistaken for cysts or pouches of the bladder, where these have purulent contents. The abscess in relation to the posterior wall of the bladder is diagnosed with difficulty; there may be localised peritonitis in the pouch of Douglas; the painful swelling may be felt per rectum, above the prostate. The most dangerous abscesses are those which communicate with the interior of the bladder. Abscesses in relation to the anterior wall are most easily recognised; according to the stage, we have an area of phlegmonous induration, or of fluctuation above the pubes; in the latter case, the urine should be drawn off with the catheter, otherwise the condition may be mistaken for a distended bladder.

As regards treatment, the intramural abscesses may be left out of count, as they are not recognised clinically, and are only met with accidentally. The perivesical abscesses may be subjected to operation when they have attained a considerable size, and have made themselves evident by their extension towards the abdominal parietes or rectum. When such an abscess has been opened, it may not be easy to recognise its origin, and whether or not it communicates with the cavity of the bladder; distending the latter per urethram may afford the required information. The details of treatment will vary with the conditions met with in each individual case.—*Arch. prov. de chir.*, Paris, 1897. Nos. 9 and 10.

The Other Kidney in Contemplated Nephrectomy.

Dr. **Edebohls** of New York maintains that, before extirpating one kidney, a knowledge of the presence and condition of the other kidney becomes of paramount importance. The aids to obtaining such knowledge are—examination of the urine, palpation of the kidney, cystoscopy, catheterisation of the ureters, skiagraphy, and finally exploratory incision. The last-mentioned is the only one of these which is capable in all cases of giving us satisfactory information regarding the exact condition of the other kidney. In cases of pyuria and tuberculosis of vesical or unilateral renal origin, catheterisation of the ureters involves the risk of infection of a previously healthy ureter and kidney, and should be avoided. The results of cystoscopy are not infrequently misleading. The author's opinion is that in every contemplated nephrectomy, in which we are not absolutely certain of the presence and exact condition of the other kidney, both kidneys should be explored. His method is briefly as follows:—The patient is placed prone on the table, the abdomen supported on an air cushion, and the skin of the entire width of the back is sterilised. Each kidney is then exposed and delivered through a vertical or oblique lumbar incision. In two cases of renal hæmorrhage, of doubtful origin, the author laid both kidneys simultaneously side by side upon the skin of the back, for careful comparative study. More often they are explored and delivered one after the other. Palpation of every part of the kidney, of its pelvis, and of the ureter, can then be performed. If indicated, any necessary operation can be carried out. After completion of examination or of operation, except nephrectomy, the kidney is returned within the abdomen. The patient is out of bed by the tenth day, even after nephrectomy. The danger of hernia, especially with the vertical incision, is nil. In practice, the author has found the lumbar exploratory incision a safe and expeditious procedure. He makes no reference to the transperitoneal method of exploring the kidneys, as practised by other surgeons.—*Ann. Surg.*, N. Y., April 1898.

Direct Catheterisation of the Ureters in the Male.

Dr. **Howard Kelly** of Baltimore has successfully practised the direct inspection of the male bladder through an open speculum, introduced along the normal urethra. The procedure is conducted on similar lines to those employed in the female, and demonstrated by Kelly himself to the members of the British Medical Association at Montreal last year. The rectum and bladder are emptied. The patient is put in the knee-breast position, with vertical or slightly flexed thighs and chest close to the table. A speculum is introduced into the rectum so as to distend it with air. The vesical speculum is then passed along the urethra. It consists of a straight cylindrical tube, 8 mm. in diameter, 15·5 cms. in length, with a funnel-shaped opening, set at an angle on a stout handle, and provided with an obturator or guide. When the speculum has entered the bladder, and the obturator is withdrawn, air enters the bladder audibly and expands it. The illumination is derived from an electric light and reflector on the forehead of the surgeon. The bladder is inspected in an orderly manner, by turning the speculum from side to side, and up and down, until every accessible portion has been seen. The ureteral orifices are found by turning the speculum to the right or left, and recognising their positions either by the slight eminence in the vesical mucosa, or by the characteristic appearance of the slit. A metal or other catheter can thus be introduced if desired. A large number of patients have been submitted to examination, some with, others without, anæsthesia. Dr. Kelly's article is supplemented by a number of excellent illustrations and clinical records.—*Ann. Surg.*, N. Y., April 1898.

ANASTOMOSIS OF THE FACIAL WITH THE SPINAL ACCESSORY NERVE, FOR BELL'S PARALYSIS.

MM. **FAURE ET FURET** of Paris report a case in which this operation was performed for the first time on record. The patient was a man, æt. 49, who had shot himself in the right ear with a revolver, eighteen months ago. Since then he has suffered from complete facial paralysis and from attacks of vertigo. An attempt had been made to extract the bullet, but it was unsuccessful. The reaction of degeneration was well marked. An incision was made along the anterior border of the sterno-mastoid. The parotid gland was displaced forwards, and the styloid process exposed in its entire length. The facial nerve, which ought to be found at the base of the process, was not to be seen. It had evidently been divided, and had become lost in the parotid gland; after a little dissection, the trunk of the nerve was found at the point where it enters the gland. The spinal accessory was then exposed where it enters the substance of the sterno-mastoid muscle; the "branch to the trapezius" (fibres for the trapezius muscle) was isolated from the more slender filaments which supply the sterno-mastoid, and cut across at its point of entrance into this muscle; this procedure was attended by twitching of the shoulder. The trapezial fibres of the accessory were then joined to the trunk of the facial by a fine catgut suture. The wound healed by first intention. There resulted a slight wasting of the trapezius, and a diminished power of elevating the shoulder. Sufficient time has not yet elapsed for judging of the therapeutic effects on the facial paralysis. In the event of the regeneration of nerve-fibres throughout the degenerated facial nerve being successful, it is possible that the patient may contract his facial muscles instead of his trapezius; on the other hand, it will be a great gain if the facial asymmetry is corrected during the resting condition of the muscles. The ultimate result will be watched with very considerable interest.—*Gaz. d. hôp.*, Paris, 8th March 1898.

Extirpation of a Persistent Omphalo-Mesenteric Duct.

Korte presented a preparation of the above, removed from a child æt 15 months. The infant had suffered from repeated attacks of intestinal catarrh, and was the subject of a prolapse at the navel, shaped like a penis, and as long as the finger. The operation consisted in opening the belly immediately to the left of the umbilicus, cutting away the persistent duct, which joined the intestine close to the attachment of the mesentery, and closing the wound in the bowel. The author referred to the normal obliteration of the omphalo-mesenteric duct in the later months of fœtal life, so that at birth it should only be represented by some solid tissue in the umbilical scar. Three degrees of arrest of this normal obliteration may be met with, namely—(1) A Meckel's diverticulum, (2) an umbilical teratoma, (3) an open communication between the ileum and the umbilicus, which shows itself after the withering and dropping off of the cord. The last of these may be dangerous, from the occurrence of prolapse of the intestine through this opening, for this may reach such a degree as to give rise to intestinal obstruction; hence such cases should be submitted to operation before the occurrence of prolapse, and the most certain and safe procedure is to excise the persistent tube, as recommended originally by Barth.—*Centralbl. f. Chir.*, Leipzig, 12th March 1898.

The Operative Treatment of Ranula.

Von Hippel recommends excision of ranula in preference to the usual method. The incision is made below the jaw; the sublingual gland and anterior belly of the digastric are pulled aside, and the cyst wall is reached by separating the fibres of the mylo-hyoid. Wharton's duct is ligatured and divided. It is rarely possible to preserve the mucous membrane of the mouth intact. The wound is drained and stitched. The resulting scar is scarcely visible.—*Arch. f. klin. Chir.*, Berlin, Bd. lv. Heft 5.

The Radical Cure of Hydrocele.

Oscar Bloch of Copenhagen has given up the treatment of hydrocele by injection of iodine, in favour of the following method, which he has practised forty-four times in forty patients. A free incision is made into the sac, and the testicle freely exposed; the entire serous membrane, both parietal and visceral, is scrubbed vigorously with gauze, soaked in a 3 per cent. solution of carbolic acid, taking care not to omit any of the recesses of the cavity. The testicle is then returned, and the sac stuffed with iodoform gauze. Three or four days later, the gauze is removed.

and the edges of the wound in the skin are sutured, without having recourse to drainage. The carbolic solution, by coagulating the albumin of the lining epithelium, prevents any further secretion of fluid; the object of the stuffing of the cavity with iodoform gauze is to complete the drying influence of the carbolic acid, and to assist in provoking an adhesive inflammation of the lining membrane. There is little or no pain after the operation, and the patient may be allowed to leave his bed within a week of its performance. General anæsthesia is to be preferred, on account of the sensitiveness of the testicle. Recurrence of the hydrocele is extremely rare—much more so than after the method of treatment by injection, whether of iodine or of carbolic acid. The procedure will doubtless commend itself to those who are disinclined to look favourably upon the radical operation employed in this country, namely, removal by open dissection of the parietal layer of the tunica vaginalis.—*Rev. de chir.*, Paris, Feb. 1898.

OBSTETRICS AND GYNÆCOLOGY.

UNDER THE CHARGE OF

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Transverse Fundal Incision in Cæsarean Section.

Clemenz (*Centralbl. f. Gynäk.*, Leipzig, 1898, No. 10) reports a case where this modification (after Fritsch) was employed for inoperable carcinoma of the cervix. Patient, æt. 34—four children—gave history of symptoms of cancer of the cervix during the last month of pregnancy. This was found on examination to involve both broad ligaments. The uterine incision extended across the uterus, from one tubal insertion to the other; the hæmorrhage was slight, and the fœtus easily extracted.

Clemenz refers to other cases reported.

Thus Eveoke believes that the fundal incision predisposes to subsequent adhesions with bowel, but Johannowsky has found this method followed by less hæmorrhage than with the ordinary median incision.

The objection raised by some operators, that this incision is too small for the extraction of a full-time fœtus, is shown by the cases reported by other operators to be unfounded.

Fœtal Urinary Secretion.

Schaller (*Centralbl. f. Gynäk.*, Leipzig, 1898, No. 13) has chosen a method which he thinks well suited for the solution of this question. As Mering has proved, the administration of phloridzin is followed by diabetes, which lasts for some time without visible effect on the general health, differing, however, from geniune diabetes in that the amount of sugar in the blood is not increased, but actually diminished. If phloridzin be given to a pregnant woman, part of it passes to the fœtus and circulates in its blood.

If the fœtal kidney acts in the same way as that organ in the mother, then sugar will be detected in the urine, and likewise in the liquor amnii —if the latter is composed for the most part of fœtal urinary secretion.

If, on the other hand, the fœtal kidneys do not perform secreting functions, or only so during the later months of pregnancy, then the presence of sugar in the liquor amnii will not be detected.

As the result of several examinations, Schaller found that up to the fourth to the sixth month of pregnancy, no sugar was found in the liquor amnii after the administration of phloridzin; and if given for some time before the onset of uterine contractions, it was only found six times in twenty examinations.

Schaller gave pregnant bitches phloridzin hypodermically for eight days, with the result that the urine contained 4 to 7 per cent. sugar, but in no case was this found in the liquor amnii obtained after laparotomy.

Schaller states that he has not yet carried his experiments far enough to enable him to come to definite conclusions.

ON THE DIRECTION OF THE CILIARY MOVEMENTS IN THE HUMAN UTERUS.

MANDL (*Centralbl. f. Gynäk.*, Leipzig, 1898, No. 13) refers to the early work of Kiwisch and Beigel, showing that those movements took place in a downward direction, from the Fallopian tube towards the cervix, and that of the histologists Kölliker, Hening, and others, that such occurs in an upward direction.

He also quotes the conclusions come to by Wyder, "that the uterine epithelium accelerates and regulates the spontaneous upward movement of the spermatozoa, and prevents the rapid passage of the ovule downwards; and, further, that the ciliary movements in the tubes do not prevent but hinder to a certain extent the entrance of spermatozoa, and thus concludes that the uterine ciliæ move upward, those of the tube downwards towards the uterus.

Hofmeier found from examination of uteri, immediately after extirpation, that the ciliary movements took place in a direction from the fundus towards the internal os.

Duhrssen, when performing his vaginal operation for retroflexion, has examined the healthy tubes for the presence of spermatozoa, with negative results. And he concludes that their presence in the tubes is not physiological, but that the same pathological process (loss of epithelium) which hinders the downward movement of the ovum, favours the entrance of sperms into the tubes.

Mandl examined eleven uteri, immediately after extirpation, preserved in saline solution, at the body temperature, and found complete absence of ciliæ in seven of the cases; in the remaining four, distinct ciliary movement in a direction *from* the fundus towards the cervix.

Mandl thus finds that the direction of ciliary movements in the human uterus differs from those found by experiments on animals, which he considers diminish the importance of the latter as explaining the process of conception and extra-uterine pregnancy.

UTERINE TETANUS, WITH THREATENED RUPTURE OF THE UTERUS.

BRUNINGS (*Centralbl. f. Gynäk.*, Leipzig, 1898, No. 15) states that the milder cases of this condition are relieved by deep narcosis; but those similar to the one he describes, where important obstetrical operations are necessary to effect delivery, are rare.

The patient, æt. 33, 3-para, had been in labour for three days when first seen. Membranes had been ruptured by a midwife soon after the onset of labour. Cervix fully dilated forty-eight hours later, when a doctor failed to deliver by forceps or turning. When Brunings saw her, the pulse was 140; head fixed in the pelvis; contraction ring distinct, near umbilical level; and there was a slight tympanitic note made out over the uterus. He perforated the head, but was still unable to deliver by the cranioclast, necessitating the performance of Cæsarean section. The patient died soon afterwards, and, on examination after death, the pelvis was found slightly contracted in all diameters, but not sufficiently so to account for the impossibility of delivering after craniotomy. Bruning believes the cause of this to have been tetanic contraction of the uterus.

He refers to the usual causes of tetanus of the uterus—rough manipulation during delivery, or prolonged administration of ergot, and quotes a case in the practice of Professor Winckel, where delivery was successful only after perforation, and then with great difficulty.

THE DIAGNOSTIC VALUE OF THE ABDOMINAL REFLEXES IN GYNÆCOLOGY.

BODON (*Centralbl. f. Gynäk.*, Leipzig, 1898, No. 5) believes from examination of 300 cases in the Budapest Hospital, that the condition of the abdominal reflexes may be of use to the gynæcologist, as well as to the neurologist. To be of any diagnostic value, the reflexes must be distinctly weaker on one side than on the other, or completely absent on one side, as in many persons presumably healthy they cannot be elicited. Bodon found that the reflexes were most easily brought out in young nulliparæ, with thin abdominal walls. He examined the reflexes in several cases of pelvic cellulitis and peritonitis, with a view of differentiating them, and although he admits the almost constant combination of the two conditions, yet he believes the results obtained might assist in the prognosis and treatment to be applied.

In pelvic cellulitis he found the abdominal reflexes unaffected; whilst in pelvic peritonitis they were lost or greatly weakened. In bringing out the reflexes in very acute cases, it was found to produce sudden pain on the affected side. This Bodon attributes to slight imperceptible muscular contractions, sufficient to cause slight displacement of the peritoneum with consequent pain.

Bodon raises the question of the existence of a reflex in the female, corresponding to the cremasteric reflex. Reference is made to the work of Geigel, who regards the inguinal reflex as [illegible] the cremasteric reflex. Bodon bases his observations fr [illegible] muscle in the male corresponding to the round ligam [illegible] both receiving fibres from the internal oblique m [illegible] movement of the uterus towards the contracting round ligament corresponding to the upward movement of the testicle in the cremasteric reflex.

In order, if possible, to bring this out, Bodon placed one finger against the anterior fornix, so as to note any movement of the fundus, and with the other hand irritated the skin on the inner surface of the thigh—result negative. He then introduced a sound into the uterus, and irritated the skin of both thighs at the same time, to ascertain any forward movement of the uterus. The result was, that the sound moved in a backward direction; showing, Bodon thinks, that the fundus had jerked forwards. He regards the subject worth further observation.

THERAPEUTICS.

UNDER THE CHARGE OF

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ORTHOFORM.

IN the April issue of this Journal a short account was given of orthoform and its use as a local anæsthetic. Kallenberger (*Berl. klin. Wchnschr.*, 21st March 1898) records his clinical experiences with it. It is anæsthetic in action only when it comes actually in contact with the exposed ends of sensory nerves, as its insolubility prevents its penetrating through the skin or even through mucous membranes. A single application often extends its action over days, for the same reason. It is non-poisonous and antiseptic. A 15 per cent. ointment made with vaseline completely relieved the pain following abrasions of the skin, from numerous causes. In cases of severe burn, an ointment of 15 or 20 per cent. strength relieved the pain completely, a single application acting as an anæsthetic for one or two days. In painful varicose ulcers, in syphilitic and cancerous ulcers, the same gratifying results were obtained. In some of these cases it was used as a powder mixed with equal parts of iodoform. In toothache it was effectual only when the nerve pulp was exposed.

Anæsthesia begins in from three to five minutes after its application, and lasts from some hours up to four days. About thirty-five hours may be taken as the average duration.

DIURETIC ACTION OF URIC ACID.

RECENTLY it has been stated by Klemperer that uric acid has a diuretic action. Futran (*Deutsche med. Ztg.*, Berlin, 1898) has tested its effect on nine cases of dropsy from heart disease, kidney disease, hepatic cirrhosis, etc., and on five healthy persons. He found that no increase of urine ever occurred as the result of its administration, the dropsy remaining quite unaffected, whilst the subsequent administration of other remedies was effective in most of the cases. He is inclined to attribute Klemperer's results to the large amount of milk and thin soup in the dietary of his cases. The most interesting point is the large quantity of uric acid which was given, without causing any appreciable effects, namely, from 150 to 450 grs. daily.

Purpura and Bleeding from Gums, caused by Quinine.

Montgomery records an instance of this rare result of the taking of quinine (*Boston Med. and S. Journ.*, 23rd December 1897). Considering how frequently quinine preparations are given internally, skin eruptions must be considered to follow very rarely; but when they do occur, the clinical picture is very dissimilar in different cases. Violent itching, urticaria, erythema, bullæ, eczema, gangrene, and other indications of intense cutaneous irritation have been very frequently recorded. Besides these, however, a few cases have been described in which bleeding took place into the subcutaneous tissue and from mucous membranes. The present case occurred in a healthy man, æt. 29, who, after taking 5 grs. quinine, woke up in the night with pains in several joints, and vomiting of blood. The gums were oozing freely; there was a small subconjunctival hæmorrhage, and many purpuric spots on the skin. The oozing lasted two days, but the joint pains only a few hours, and there was no constitutional disturbance of any kind. He had previously had a similar attack after a 10-gr. dose of quinine.

Influence of Bismuth Subnitrate on Gastric Secretion.

Fleiner has stated that large doses of subnitrate of bismuth greatly reduce the amount of free hydrochloric acid in the gastric juice of patients suffering from gastric ulcer and excessive acidity. This diminution of gastric juice has been noted by other observers, but not in such a systematic way as to decide the question of its practical value in such cases. Olivetti (*Therap. Monatsh.*, Berlin, April 1898) has made observations on two cases of gastric ulcer with acidity, and on two cases of excessive hydrochloric acid secretion, giving from 150 to 300 grs. of the bismuth salt early in the morning on an empty stomach. Test meals were given at intervals, and the conditions carefully investigated. As a result, he comes to the following conclusions:—

1. Large doses of bismuth subnitrate greatly improve the symptoms in these cases, both at the time and afterwards.
2. This improvement is not lasting, but is both more marked and more lasting in cases of ulcer than in cases of acidity.
3. The best dose is from 150 to 225 grs., given once a day before breakfast.
4. Larger doses have apparently no better effect than these.
5. In acidity the secretion of HCl is very little influenced, and the slight decrease which is often observable cannot account for the lessening of pain and vomiting which is seen as a result of giving bismuth. The explanation is more probably to be found in the bismuth salt forming a coating over the ulcer, and protecting it mechanically.

MEDICAL JURISPRUDENCE.

UNDER THE CHARGE OF

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MEDICO-LEGAL ASPECTS OF CREMATION.

THE late Professor Hofmann, in a paper upon cremation, discusses the medico-legal bearings of the question. He states that during twenty years' experience in performing the post-mortem examinations on medico-legal cases in Vienna, he had only to deal with six exhumations, of which two were ordered on account of poisoning being suspected, a third in order to make out whether abortion had occurred, and the fourth in a case of suicidal hanging; while the other two were held in order to determine, in one case, the identity of the body, and in the other whether a will had been buried along with the corpse.

These cases show that, while exhumations are comparatively rare, the causes which necessitate them are various, and not confined to the question of suspected poisoning.

He recognises the disadvantages which might result to the ends of justice by the compulsory introduction of cremation, however advisable it may be on purely sanitary grounds; but he is of opinion that no reasonable objection can be taken to cremation, in all cases where the cause of death has been clearly decided, and where no necessity will arise for subsequently calling in question the bodily state of the individual. If there should be the slightest doubt in the latter respect, then cremation should not be permitted, or only after any doubtful questions have been fully investigated by an experienced examiner, aided, if necessary, by a chemical analysis.

In spite of such precautionary measures, crime might escape detection, but such cases would be very exceptional; and Hofmann points out that the same objections hold good in regard to embalming, which renders a decision on many medico-legal points difficult, and, so far as poisons are concerned, practically prevents proof of their administration. —*Wien. klin. Wchnschr.*, 1898, No. 7.

THE RELATIONSHIP BETWEEN SUBPLEURAL ECCHYMOSES AND DEATH FROM ASPHYXIA.

PROFESSOR FRITZ STRASSMAN, in a paper read before the International Medical Congress at Moscow, discusses the question of the presence of subpleural ecchymoses, as affording evidence of death having occurred from asphyxia. As is well known, Tardieu first drew attention to these ecchymoses, and regarded them as practically diagnostic of this form of death. For long his teaching was followed by medical jurists throughout the world, and in our own country the late Professor Ogston used to state that he would not certify a death from suffocation in the absence of this sign.

Considerable doubt has, however, been raised as to their diagnostic worth, owing to such ecchymoses having been observed in many forms of death, where a theory of any obstruction to respiration could not be maintained.

Professor Strassmann, after a general discussion of the question, states that he has observed petechial ecchymoses in various parts of the body in death from epilepsy, poisoning by strychnia, cyanide of potassium, opium, arsenic, carbolic acid, and tainted food; and also in children who have died from laryngismus stridulus, bronchial catarrh, and catarrh of the intestines; in newly-born children from compression of the head; and in death from sunstroke.

He is of opinion that the presence of subpleural ecchymoses can only be regarded as proving that in all probability death has occurred from failure of the respiration, and not from primary failure of the heart; that is to say, that the respiration has ceased prior to stoppage of the heart's action. In this respect they are of interest, and should be carefully observed along with the other post-mortem appearances present. They afford no evidence, however, as to the cause of death, and are therefore, from a medico-legal aspect, valueless.

Professor Strassmann refers to the danger of a miscarriage of justice which may result from the old teaching, and asks the members of the Congress to pass a resolution to the effect that "subpleural ecchymoses are worthless as positive evidence of the cause of death, and that the diagnosis of death from asphyxia should not be based upon anatomical appearances at all."—*Vrtljschr. f. gerichtl. Med.*, Berlin, 1898, part 2.

In relation to the above subject, Professor Haberda of Vienna read a paper at the same Congress upon "The Post-mortem Origin of Ecchymoses."

The author points out that Hofmann many years ago drew attention to the fact that, in consequence of the weight of the blood in a dead body, ecchymoses not only become increased in size, but, owing to the pressure of blood in the vessels, capillaries may rupture, and thus lead to effusions of blood which simulate in appearance those produced during life. The practical importance of Hofmann's observation, from a medico-legal point of view, is apparent, and the subject has since been investigated by several observers.

Lesser opposed the views of Hofmann, as a result of experiments carried out upon bodies which he suspended by the neck or feet for a period of twenty-four hours, and then examined. In spite of well-marked hypostasis, he found no ecchymoses produced. Haberda points out, however, that these experiments were not carried out on fresh bodies, but upon those in which the post-mortem lividity was already developed; and in his own experiments upon newly-born children, which died shortly after birth, he found, after hanging them up by the legs, in the course even of an hour, petechial ecchymoses developed in the conjunctivæ, which could not be distinguished in appearance from ordinary ecchymoses. He was able also to satisfy himself that these small effusions of blood increased in size as hypostasis developed. In many forms of death small ecchymoses may be seen in the skin, but in such cases the blood in the body has remained fluid, or is only very slightly coagulated in the heart. Such petechial ecchymoses in the skin may be masked by post-mortem staining, and, while they may be present in the bodies of young persons, their development is favoured by abnormal fragility of the vessels, and they are therefore more frequently seen in the case of elderly people.

While it is possible that the actual rupture of a capillary may have occurred during life, the resulting ecchymosis being so small as not at first to be noted, until the transudation of blood-colouring matter some time afterwards renders it apparent, yet there can be no question that small blood extravasations can also be developed post-mortem, in consequence of the sinking of the blood after death to the dependent portions of the body.

Not only may this occur in the skin, but extravasations of blood may also occur in the same way into the subcutaneous tissues and between the muscles, and do not, therefore, necessarily indicate that they are the result of violence inflicted during life.—*Vrtljschr. f. gerichtl. Med.*, Berlin, 1898, part 2.

The Application of Entomology in Medico-Legal Cases.

The remarkable results of Mégnin's studies on cadaveric fauna are well known. For over fifteen years he has been entrusted at the Paris Morgue with the investigation of cases in which human remains, more or less decomposed, have been found, and where it has been of importance to determine the period when death took place. This he has done with great success, and in the *Bull. Acad. de méd.*, Paris, of March last, he records three new cases in which, by means of the application of entomology, he was able to arrive at satisfactory conclusions as to the time of death. All related to newly-born children, which were found many months after birth in a highly decomposed state.

Two infants, which were found in a trunk under the bed of a servant, were submitted to him for examination in October 1897, and he states that in one Diptera were not present, indicating that death occurred at the time of year when these flies are absent, that is to say, in winter. There were numerous larvæ of *Dermestes lardarius*—a beetle which invades the body from the third to the sixth month after death, when they are attracted by the odour of the fatty acids then formed. In addition, there were numerous colonies of Acari, genus *Tyroglyphus*, beginning to establish themselves on the skin, and betokening their presence by the formation of a fine yellow powder, composed of Acari, living and dead, and their dejections. Mégnin concluded that, owing to the absence of Diptera, death must have taken place in winter, and from the fact that the *Dermestes* of rancid fat make their appearance three to six months thereafter, that the death had probably occurred ten months before, namely, in January 1897. The subsequent confession of the prisoner confirmed the conclusion arrived at.

The second child was in a desiccated and mummified state. Mégnin found the remains of Diptera, namely, *Cyrtoneura*, *Calliphora*, and *Sarcophaga*, and numerous larval casts of *Dermestes lardarius*; but no living larvæ of this latter species. The work of these insects had evidently been interrupted by the previous winter; and, allowing three months for the operations of the Diptera, and six for those of the *Dermestes*, this gave the period of death as nine months previous to the winter (1896–1897), that is to say, the spring of 1896, or nine months prior to the death of the first child examined.

The third case was analogous in many respects; but, from the character of the Diptera present, he concluded that death had occurred during the summer of the previous year, or eighteen months before.—*Bull. Acad. de méd.*, Paris, No. 12 Séance du 22 Mars 1898.

DISEASES OF THE EYE.

UNDER THE CHARGE OF
GEORGE A. BERRY, M.B., F.R.C.S.Ed.,
OPHTHALMIC SURGEON, EDINBURGH ROYAL INFIRMARY;
AND
W. G. SYM, M.D., F.R.C.S.Ed.,
ASSISTANT OPHTHALMIC SURGEON, EDINBURGH ROYAL INFIRMARY.

Bullous Keratitis.

This subject is one which has received somewhat scant justice in the text-books, in which the affection is usually stated to occur in eyes already the subjects of glaucoma, or of other disease causing grave disorder of nutrition. In addition to these types, Hansen Grut described the recurrent form, which results from a trauma. The whole series of cases fall naturally into two groups—(*a*) Those occurring in eyes hitherto healthy; and (*b*) those arising in eyes already the subject of disease: in the first group the cause is external, in the latter it lies in the eye itself. Primary bullous keratitis usually is found in a patient injured some little time previously by a nail scratch, or an abrasion of the cornea caused by a twig or similar object. The patient wakens in the morning with a pain in the eye, which is often very violent, because the origin lesion has left the nerve-endings in a hyperæsthetic condition, and the regeneration of epithelium has been somewhat defective. These attacks occur with greater or less frequency, and may persist at intervals even for years. The pain is not always relieved by the first flow of tears, but may be severe and continuous, with photophobia, hyperæmia, and swelling of the lids, and in such a case one will find on examination a large bulla of the cornea. This bulla is not tense, but "slack," its limpid contents being easily displaced by gentle movement of the lid over the globe. In certain cases, by laying hold of the epithelium with forceps, one can strip it off a large area, over which it is detached, leaving a raw surface extending to even half the cornea. When the dead epithelium is stripped off it is renewed in a few hours, but the same process may go on five or six times a year. This lesion has manifestly nothing in common with herpes cornea. The most frequent of all causes of the original injury is nail scratch, though it may be produced in other ways; but what seem to be the necessary conditions are, that the lesion should be both superficial and extensive; it has not been seen following the ordinary "foreign body."

Generally speaking, the fluid in the bulla is and remains transparent, but occasionally it becomes turbid, and hypopyon is present with iritis. As to the pathology of this bulla formation, it is difficult to give a satisfactory explanation; it can hardly be due to an infection of the wound, else why the long delay, and the recrudescences after intervals of an apparent healthy condition of the cornea? Hansen Grut regards the cause as purely mechanical; when the original injury occurs, the epithelium is torn off, and the lymph cavities surrounding the nerve terminations are laid open; the presence of the lymph exuded prevents so firm an adherence of the new epithelium to the underlying tissue as should be, and but a slight irritation is required to produce a fresh exudation of lymph, raising in a bleb the epithelium thus imperfectly anchored. In the treatment, prophylaxis is of great importance; in every case of abrasion of the cornea, the eye ought to be bandaged for several days until healing is complete and sound. Once a bulla is formed, in the author's opinion the best treatment is to pick away all the loosened epithelium, and treat the surface antiseptically. Cocaine, which one is tempted to use to mitigate the pain, is distinctly contra-indicated, as having an injurious effect upon the epithelium, a remark which is also applicable to corrosive sublimate. Secondary bullous keratitis is usually to be seen in eyes whose tension is much increased, and its occurrence is as a rule accompanied by severe pain, but not always.—*Arch. d'Opht.*, Paris, April 1898.

Scintillating Scotoma.

Much has been written on this subject by Gowers, Zehender, Listing, Antonelli, and others, but fresh facts are still to be desired. Hilbert (Sensburg) describes two cases (*Centralbl. f. prakt. Augenh.*, Leipzig, April 1898) of some interest. The first was that of a very neurasthenic woman, æt. 58, who had presented for years nearly every possible nervous disturbance with the exception of hemicrania, which she had never had, when suddenly one day she developed a violent left-sided hemicrania with scintillating scotoma, which she described in the following manner:—The whole central area of the field of vision is occupied by light blue discs in constant motion; and over the area in which these are, vision is lost; the background against which these blue discs are seen is black. The patient was much excited, alarmed with the idea of impending blindness; she refused, however, to allow ophthalmoscopic examination. Under treatment by large doses of caffeine the symptoms passed away completely.

The second case was that of a lady, æt. 37, somewhat neurasthenic and liable to hemicrania, but who had never previously suffered from the scotoma. Following, however, upon severe mental excitation, she developed scintillating scotoma along with the hemicrania; her description of the appearances is somewhat thus: The whole field, with the exception of a narrow peripheral zone, is filled with variously coloured rings twining through one another. Each ring has the apparent diameter of a lens; some being red, others yellow, green, violet, and purple; others again have two colours, and all are in constant movement against a dark brown background. Within the area thus affected vision is lost. The head and conjunctivæ were engorged, and the temporal arteries pulsated strongly. Ophthalmoscopically, there were no pathological appearances beyond some fulness of retinal vessels; in particular, there was no pulsation of retinal arteries. Here again citrate of caffeine caused the dispersion of symptoms; but in this instance they returned again each morning for a fortnight, in exactly the same form as above described, only finally vanishing after a course of quinine, though there was no evidence of malaria. The rounded rather than angled form of the coloured portions is not usual in such cases, and the coloration is also infrequent when such manifestations are present; in the first case the discs were blue, in the second of various colours, and the patient compared the appearances to those seen in a kaleidoscope.

GLASSBLOWER'S CATARACT.

It has long been known that glassblowing is an occupation those who follow which are apt to become affected with cataract; there are now somewhat numerous observations recorded of this circumstance. Hirschberg of Berlin has recently (*Centralbl. f. prakt. Augenh.*, Leipzig, April 1898) devoted some attention to the matter, and noted a series of cases. It is frequent that those who suffer exhibit also a redness and dryness of the skin of the face, attributed to the exposure to heat, which change may be solely on the side directed to the blaze. And it is on this side also that cataract (first) appears. As illustrating the liability of glassblowers to the disease, Hirschberg says that a certain business firm employs thirty men at this work, of whom five are over 40 years of age. *All those five* have become affected with cataract, though all are in good health. Meyhofer observed the temperature, at the distance from the furnace at which the worker's left side usually is, to be 65° C. (149° F.), and noted that, as he usually had that side to the blaze, the left eye was that chiefly affected; he suggested also, that in this extreme heat the necessary rapid pouring out of perspiration might be a factor in the production of the lesion.

In the connection of cataract with this exposure to heat and glare, Hirschberg sees some analogy with the fact that in the East Indies not only is cataract more common than it is at home, but that it occurs in a series of distinctly younger persons; it is about the age of 40, or soon after it, that the native of Calcutta or Bombay is operated upon for senile cataract, not when 60 as at home. Under the scorching sun of India, cataract develops twenty years earlier than it does at home. The conclusion is that the crystalline lens, when exposed for a long period to heat rays of high temperature, is apt to lose its transparency. Is the inability of the normal eye to see the ultra-red rays, *i.e.* the heat rays or those of low refrangibility, due to their absorption by the lens (thus leading to its opacity, as we have seen), or is it due to their not stimulating the retina as others do? There is difference of opinion among savants on this question.

It must of course be obvious that the presence of the cornea and aqueous humour afford great protection to the lens from the heat, but in course of time even this is insufficient. The much greater activity of the reparative processes of the cornea is the explanation of its comparative immunity from harm. On account of the extreme slowness with which even the lens is affected, experiments on animals have not succeeded well in producing "heat cataract"; and on account of the remoteness of the danger, and the inconvenience involved in using any protection, it is well nigh impossible to induce the workmen to wear a shield or take any precautions.

REPORTS OF THE MEDICAL SOCIETIES.

Edinburgh Medico-Chirurgical Society.—*4th May* 1898.—Dr. **James Carmichael**, and afterwards Dr. **John Smith**, in the chair.—Dr. **Scot Skirving** showed a patient after operation for ectopic perineal testicle. Dr. **William Taylor** showed the electro-thermogen which he had used in the treatment of neuralgia with success. It consists essentially of a glass tube, through which a current of air is driven by means of a fan. This glass tube is surrounded by a coil of platinum wire, which is heated by an electric current. The heated current of air is made to play upon the affected part.

Dr. **James Carmichael** read a paper on "Pneumonia in Childhood," which will appear in a future number of this Journal.

Dr. **G. W. Balfour** then read his paper, "A Fit of Gout: a Pathological Study," which appears in the present number.

Edinburgh Obstetrical Society.—*Wednesday, 11th May* 1898.—Dr. **Milne Murray**, Vice-President, in the chair.—Specimens were shown by Dr. **Lackie** for the President, by Drs. **Brewis**, **Jardine**, **Buist**, **Haultain**, and **Ferguson**.

Communications.—Dr. **Buist** read a paper on "Recent Modifications of Anterior Colporrhaphy," in which he pointed out the importance of dealing with the cystocele which so frequently accompanied this condition and proposed that the two ends of the usual longitudinal incision should be brought together, and that the prolapse of the bladder should be prevented by a series of transverse sutures. In conclusion, Dr. Buist gave the details of a case in which he had carried out this method of operation.

Dr. **Kynoch**, Dundee, read a paper on "Toxæmia in Pregnancy," and recorded three illustrative cases. In the first there were symptoms of severe headache and dyspnœa. It might possibly have been a case of early yellow atrophy of the liver. The second case was one of dermatitis herpetiformis occurring during pregnancy, and probably due to auto-infection. The third was one of acute puerperal mania due to toxic infection, the result of defective action of the excretory organs.

Dr. **Jardine**, Glasgow, read "Notes of Four Cases of Cæsarean Section," and described in detail the operations. Of the four, two mothers were saved and three children.

Dr. Jardine also read a note of a "Curious Central Tear of the Perineum," and Dr. **Brewis** recorded a case of "Total Hysterectomy of a Four Months' Gravid Uterus for rapidly-growing Fibro-myomata," and described in detail the operation performed.

GLASGOW PATHOLOGICAL AND CLINICAL SOCIETY.—*9th May* 1898.—Dr. **DONALD FRASER** in the chair.—Dr. **JOHN M'C. JOHNSTON** read the clinical history, and Dr. T. K. **MONRO** the pathological report, of a case of acromegaly; a description of the clinical aspects of this case was given by Dr. Middleton in the *Transactions of the Society* for 1895. The pituitary body is represented by a large red mass, much softer than brain substance; some washed away by a gentle stream of water; the remaining mass, somewhat flattened, measures 2 in. by 2 in. The upper border of the posterior wall of the sella turcica is eroded. The middle fossa of the cranial base is deepened in both its lateral portions. The right crus cerebri is eroded on its inferior aspect; the left is reduced to a thin gelatinous looking cord, which has no resemblance to brain tissue.

After hardening in spirit:—The mass weighs nearly an ounce, and its measurements are 2⅜ by 2⅛ by 1⅜ in. The appearance is not homogeneous. Part of it would, with its faded brownish colour, readily pass for voluntary muscular tissue which had been kept in spirit. The cut surface is brown or reddish brown, and not unlike muscle, but much more finely granular.

Microscopical sections, made both at the surface and more deeply, show that the structure is sarcomatous, penetrated by connective tissue septa in which blood vessels run, composed of rounded cells, mostly of medium size, with a single large nucleus. An occasional focus is seen where the round cells are smaller, so that the deeply stained nuclei are relatively more numerous than elsewhere, thus suggesting a rapid multiplication of the cells. Here and there, too, the cells are grouped in such a way as to recall the acinous arrangement of cells in the normal hypophysis.

Dr. **DONALD FRASER** showed a specimen from a presumed case of acromegaly. Dr. H. **RUTHERFORD** showed and described a case of painful subcutaneous tumour occurring in the midst of nævoid tissue.

Card specimens were also shown by Dr. **GEORGE H. EDINGTON**—(*a*) Humerus from fracture dislocation at the elbow; (*b*) ankylosis of the knee-joint following injury; (*c*) comminuted fracture of radius, with separation of the styloid process of the ulna; (*d*) a comminuted fracture of the surgical neck of the humerus; (*e*) resected ribs from chronic empyema. By Dr. **GRANT ANDREW**—(*a*) A pin surrounded by fæcal concretion, from sinus near the appendix; (*b*) dentigerous cyst; (*c*) a large hair ball from stomach of calf. By Dr. L. R. **SUTHERLAND**—(*a*) A sarcoma involving the pituitary body; (*b*) a tumour of bronchus with bronchiectasis; (*c*) a small adeno-myoma of the gall bladder.

GLASGOW MEDICO-CHIRURGICAL SOCIETY.—Meeting of 15*th April*.—Dr. **A. N. MACGREGOR** showed two infants, 2 and 3 months old, upon whom he had performed the radical operation for the cure of spina bifida, with an excellent result. Dr. J. H. **NICOLL** also showed a case of spina bifida in a girl of 7, on whom he had operated. The paralysis present before the operation had gradually lessened, and was now almost absent. Dr. J. A. **ADAMS** read a paper on excision of the pylorus. The patient, a man of 70, died fourteen days after the operation from pneumonia. The union between stomach and duodenum was found to be very good. He thought pylorectomy indicated in all cases where an early diagnosis had been made. Dr. A. N. Macgregor read notes on two cases of multiple sarcomata, and held that they could not be secondary growths from a primary lesion infecting the blood stream, as they were limited to the trunk. Dr. G. H. Edington then related the particulars of a case in which operation for tuberculous lesions on a limb was followed by acute tuberculous choroiditis.

Meeting of 22*nd April.*—Dr. Middleton showed a case in which there was congenital absence of the left radius and left thumb, malformation of the left ulna, spinal curvature, and absence of some of the carpal bones. Dr. T. K. Monro then showed two cases which had recovered from symptoms of cerebral tumour. Dr. Alexander Robertson then showed two cases of cardiac disease which had improved under the Schott treatment. The dulness diminished in all directions, and the general symptoms improved. Dr. R. B. Ness read a paper on the case of a girl of 17, with marked cyanosis, partly from chronic pulmonary condition, partly from marked deformity of the thorax. There was no congenital malformation of the heart, or organic cardiac lesion.

Meeting of 6*th May.*—Dr. John Love showed a case of aphasia, in which there was almost complete letter-blindness, with only partial word-blindness, and without hemianopia. There was no agraphia. The patient had a remarkable power of reading mirror-writing. Dr. G. H. Edington showed excision of the wrist with a successful result. Dr. T. K. Dalziel showed (*a*) three specimens of urinary calculi; (*b*) a case of actinomycosis of the cervical lymphatic glands, of seven months' duration; (*c*) a specimen of papilloma of the ovary, where the capsule had ruptured, and general peritoneal infection had occurred; (*d*) a large congenital tumour of the neck from an infant 3 weeks old, and (*e*) a specimen of carcinoma of the parotid gland.

ANALYTICAL REPORTS.

Ross Limited, Manufacturing Opticians, London.

In the catalogue for 1897–98, sent us by Messrs. Ross, a most marvellous array of scientific apparatus is presented, from photographic cameras, capable, as the practical experience of an Australian artist shows, of taking 210 negatives in seven hours,—all babies, in this instance, making the performance more wonderful,—to triunial cinematographs supplied with three lanterns, so that the name of the subjects of the films can be thrown on the screen by the upper lantern before the actual projection of the cinematographic figures by the lower one, while the time occupied in changing the cinematograph films can be occupied by showing ordinary dissolving views from the middle lantern. From the figures and descriptions of microscopes in the catalogue, we should say that as excellent instruments for all branches of microscopical science could be obtained from Messrs. Ross at moderate prices as could be procured from Germany. The microscopes mentioned in the catalogue include instruments designed for class work at from £6, 15s. to £8 each, petrological microscopes at £10, 10s., and a bacteriological microscope costing £13, 10s., with one eyepiece; the object glasses or oil immersion objectives of various powers are charged separately. Among the other articles we notice spectacles and eyeglasses in elegant forms, and all descriptions of drawing requisites. Several useful tables for photographic purposes and for measuring distances are included in the catalogue.

Vinolia.

Blondeau et Cie, London, have submitted for our notice samples of their vinolia preparations. The samples sent comprise their vinolia liquid dentifrice, and vestal vinolia soap. The liquid dentifrice is in the form of a yellow-red fluid, with a strong and not disagreeable aromatic odour. It contains many antiseptic vegetable volatile oils, and from its behaviour when added to water apparently some sal-volatile. The dentifrice is largely an alcoholic solution, burning easily on the application of a flame, and leaving a residue in the form of pink drops which still retain a strong aromatic odour. After using it, we should say that it is of more service as a tonic and strengthener of the gums than a powerful agent for cleansing the teeth. Indeed, the makers advise the use of the dry dentifrice first followed by the liquid preparation. At all events the gums appear to be much benefited by its use, and its antiseptic powers render it a good application for use after a meal or at bedtime.

The vestal soap is the finest product among the soaps made in the Vinolia Works. It is even more soothing to an irritable or tender skin than the ordinary vinolia soap, and is superfatted and delicately perfumed. Its only drawback is its price, 2s. 6d. per cake.

Betul-Ol (Kühn).

There is no doubt that natural salicylic acid and its compounds are very much to be preferred to the artificial products. Probably many have discontinued the use of salicylates, deterred by the occasional ill effects caused by impurities present in the salicylic preparations made synthetically, so that the introduction of a natural compound, at a reasonable price and of undoubted purity, is a matter for congratulation. Betul-ol is salicylate of methyl made up as a liniment. The active agent is derived from *Betula lenta*, and is very similar to or identical with the oil of wintergreen obtained from *Gaulthera procumbeus*, though its smell does not appear to be quite so penetrating. In the form of a liniment, as in betul-ol, it is claimed that it is readily absorbed through the skin, forms salicylate of sodium in the blood, and produces the pharmacological effects of this salt in the body, unaccompanied by any of the untoward results following upon the administration of the synthetic salicylates.

R. H. Thomson & Co.'s Whisky.

Messrs Thomson & Co. have sent us a small sample of their Scotch Cream, very old, guaranteed pure Malt Whisky, which we find possesses a fine aroma, a pleasant, mild taste, and a specific gravity of 0·93, or about 48·0 per cent. of alcohol by volume. It has an acid reaction, but not more acid than normal. It is evidently an old matured spirit, which has lost some of its alcohol by evaporation, but has gained so much in flavour and mildness by keeping that it now forms a really fine brand.

MONTHLY NOTES
ON METEOROLOGY AND VITAL STATISTICS.

By A. LOCKHART GILLESPIE, M.D., F.R.S.E., F.R.C.P.Ed.,

MEMBER SCOTTISH METEOROLOGICAL SOCIETY.

METEOROLOGICAL MEANS FOR THE EAST OF SCOTLAND DISTRICT, FOR THE FOUR WEEKS ENDING APRIL 30, AND FOR THE YEAR FROM JANUARY 2.

	Temperature.			Rainfall in Inches.		Sunshine. Hours.		Mean Daily Variability of Temperature.
	Mean.	Accumulated Day-Degrees.		Actual.	Accumulated from Jan. 2.	Actual.	Accumulated from Jan. 2.	
		Above 42°.	Below 42°.					
Mean .	43°·6	*[1] 116° [2] 249°	88° 619°	1·8	9·1	125	334	2°·78
Observed	45°·4	[1] 147° [2] 335°	35° 386°	3·4	8·3	93	338	2°·6
Difference	+1°·8	[1] +31° [2] +86°	− 53° −233°	+1·6	−0·8	−32	+4	−0°·18

VITAL STATISTICS.

MORTALITY IN FOUR LARGE TOWNS IN THE EAST OF SCOTLAND, DURING APRIL, AND SINCE JANUARY 1. Actual Numbers and Rate per 10,000 per annum.

	Total.		Constitutional Diseases.		Circulatory System.		Nervous System.		Respiratory System.	
	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.
Deaths expected and Mean Rate for 1891–1896	[1] 1079 [2] 4789	191·3 212·1	213 857	37·8 37·9	117 448	20·7 19·8	125 528	22·2 23·4	227 1101	40·2 48·8
Actual Deaths and Rate per 10,000	[1] 1206 [2] 4492	213·4 199·0	240 965	42·5 42·6	123 448	21·8 19·8	136 518	24·1 23·0	249 924	44·0 41·0
Difference from Mean	[1] +127 [2] −297	+22·1 −13·1	+27 +108	+4·7 +4·7	+6 ±0	+1·1 ±0	+11 −10	+1·9 −0·4	+22 −177	+3·8 −7·8

	Digestive System.		Urinary System.		Pneumonia.		Phthisis.		Cancer.	
	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.
Deaths expected and Mean Rate for 1891–1896	[1] 62 [2] 266	10·9 11·8	28 114	4·9 5·05	88 380	15·6 16·8	108 444	19·3 19·6	42 180	7·4 8·0
Actual Deaths and Rate per 10,000	[1] 72 [2] 313	12·6 13·8	36 111	6·3 4·9	106 380	+18·9 16·8	121 453	21·3 20·0	50 228	8·8 10·1
Difference from Mean	+10 +47	+1·7 +2·0	+8 −3	+1·4 −0·15	+18 ± 0	+3·3 ±0	+13 + 9	+2·0 +0·4	+ 8 +48	+1·4 +2·1

* NOTE.—The figure [1] denotes the data for April, [2] for year to date.

April was a warm month, but very wet and sunless. The most prominent feature during its course was the very heavy rainfall of the last four days. Up to the third week the amount of rain was not much over the normal, but in the last week of the month almost double the usual precipitation occurred, the excess for the four weeks reaching as much as 88·8 per cent. of the average total fall. The deficit in the sunshine value formed 25·6 per cent. of the normal. The variability of temperature from day to day was a little less than expected, while the excess in warmth was due more to absence of cold than to presence of any great increase of temperature, and was more marked during the nights than during the daytime. There was a marked prevalence of southerly winds during the month.

From 1st January the temperature values show a great increase. The rainfall is still below normal, the hours of sunshine a little above.

During the month of April the number of deaths which occurred in the four large towns in the East of Scotland, discussed here, was greater than the average for the first time since October 1897. There has been, therefore, a period of five months during which the deaths were below the mean, the figures being 5467 in place of 6275, a deficiency of 12·8 per cent. of the latter figure, or 28 per 10,000 per annum for the five months. The deaths during April rose to 22·4 per 10,000 over the normal; and, without exception, all the systems noted contributed to the excess, especially with regard to constitutional and respiratory diseases. Digestive maladies continued to prove more fatal than usual for the season. Influenza directly caused fifty-one deaths, or 4·2 per cent., of the total number of fatal cases.

From the commencement of the year the mortality still remains below the average, the deficiency being largely due to the lessened number of deaths from diseases of the respiratory organs. Deaths from pneumonia and cardiac disease coincide with the numbers looked for; but constitutional, digestive, and cancerous diseases have been responsible for fewer deaths than usual.

In the month of April, therefore, characterised by an increase of warmth, a rainfall much larger than usual, a deficiency of sunshine, a slightly decreased daily variability of temperature, and a great excess of winds from a southerly direction, the mortality was high, especially from respiratory disorders, while the deaths from influenza were more numerous than for some time back.

For the year to date very similar relations to those prevailing at the end of March continue, except that the excess of warmth has increased, and the diminution in the number of deaths from the normal is less marked.

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